

EUROPE

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PREFACE

This book is based in nearly equal proportions upon personal observation, reading, and statistics. It represents the combined viewpoints and methods of a European and an American geographer. Although each is a product of his own type of training, both have been deeply influenced by wide travel in other continents, as well as in Europe, and by long residence outside of either America or Europe. One has read widely in languages other than English; the other has specialized in the use of geographical statistics.

The first draft of the book was written by Dr. van Valkenburg. It was distinctly European in method and laid special stress on relief and geological structure. This first draft was revised in collaboration with Dr. Huntington, who rewrote the revised draft and made extensive additions which in some cases have expanded into chapters. Chapters III to V on the relief and appearance of Europe together with those on Scandinavia, Holland, Belgium, France, Germany, Austria, and Switzerland are especially representative of the work of Dr. van Valkenburg, while Chapter XVII on the migration of the centers of civilization, and the chapters on Great Britain, Ireland, Greece, and Russia, were written mainly by Dr. Huntington. Even in these chapters, however, and still more in the rest of the book, the work of the two authors is so blended that they themselves are often at a loss to remember which ideas have been introduced by one and which by the other.

The book is adapted to a course lasting either half a year or a year. If used for half a year the authors suggest the omission of all parts in fine print together with the whole of Chapters XVI and XVII. These parts are more advanced and difficult than the rest or else are historical or theoretical. They are designed for relatively advanced students and are intended to serve as an introduction to topics that need further study from other sources. The bibliography at the end of the book has been prepared with a view to such uses as well as to more general study of individual countries.

In Part I of the book Chapters II, III, IV, and V contain a comprehensive description of the climate, appearance, and main natural regions of the continent as a whole. They lay a foundation whereby the succeeding chapters on soil, vegetation, commerce, population, and

so forth not only build up a picture of the continent as a whole and of its main natural regions, but also prepare the way for a detailed treatment of individual countries in Part II. The space devoted to the various countries in Part I is based partly on size and population, but also on political status, historical interest, and typical character. Hence, among the Great Powers, Great Britain and Germany receive three chapters each, while Russia, France, and Italy receive two. Among the small countries Holland, Switzerland, and Greece are given a relatively large amount of space.

The authors owe an incalculable debt to scores, perhaps hundreds, of other authors whose ideas they have set forth without being conscious of their exact source. They also owe much to the patient and constant assistance of the Libraries of Yale and Clark Universities. Equally grateful acknowledgment is due to a few individuals: Miss Rebecca M. Taliaferro, for a very careful and critical reading of a large section of the manuscript; Dr. W. Elmer Ekblaw and Dr. Clarence F. Jones, for reading the chapters on land utilization and manufacturing; Dr. Earl B. Shaw, for help in compiling material for the chapters on manufacturing, trade and commerce, and population; Mr. John J. Curtis, for editing the original manuscript; Dr. William van Royen, for making the cross sections; and Messrs. Milton Corbin and Franklin Erickson, for drawing the maps. Although most of the maps are original with the authors and have been compiled from recent statistics, some have been taken from other sources. Hearty thanks are due to Count Teleki and others whose names appear with such maps.

NOTE TO THE TEACHER

Every class that studies Europe ought to have access to recent statistics. Therefore, it is especially desirable to purchase the books mentioned in the first section of the bibliography at the end of this book. The *Statistical Yearbook of the League of Nations*, *The Statesman's Yearbook*, and the *Commerce Yearbook* are the most essential among these. Still more essential is a good atlas in the hands of each student. Goode's *School Atlas* (Rand McNally Company, Chicago) is excellent. The authors have found it especially convenient and profitable to use Bartholomew's *Oxford Advanced Atlas* (Oxford University Press, New York).

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EUROPE

CHAPTER I

EUROPE AS A CONTINENT

Introduction.—This book attempts to explain the relation between geographical environment and the three great phases of Europe's development—economic, cultural, and political. The absence of such knowledge causes endless misconception, even among advanced students. Many books, to be sure, attempt to explain how Europe differs from the other continents, why it is dominant, the appearance of the various parts, and the political and economic status of the individual countries. Such knowledge is essential and needs to be restated frequently in harmony with the latest geographical research. Therefore all these matters are fully treated.

It is equally necessary, however, to understand the systematic quality of the variations in the geographic environment, and hence in human life and history, within the limits of Europe itself. Merely to explain the contrast between Europe and the other continents, and then to treat each country separately, is not enough. It is also necessary first to inspect the various elements of geographic environment one by one in their relation to Europe as a whole, and then to ascertain how the physical diversity which thus becomes evident is related to human activities. Hence two fifths of this book discusses Europe as a whole, laying special emphasis on the systematic way in which the continent is divided into zones of culture, which in turn are closely coincident with the geographic environment.

The main idea which thus emerges is that in our day the region within four or five hundred miles of the North Sea is a focus from which there is a systematic change outward in all directions. This is illustrated by a great number of maps which show how the same general pattern reappears in an amazing number of ways. It is also illustrated by historical sketches of the way in which the centers of many kinds of activity have changed their location from century to century.

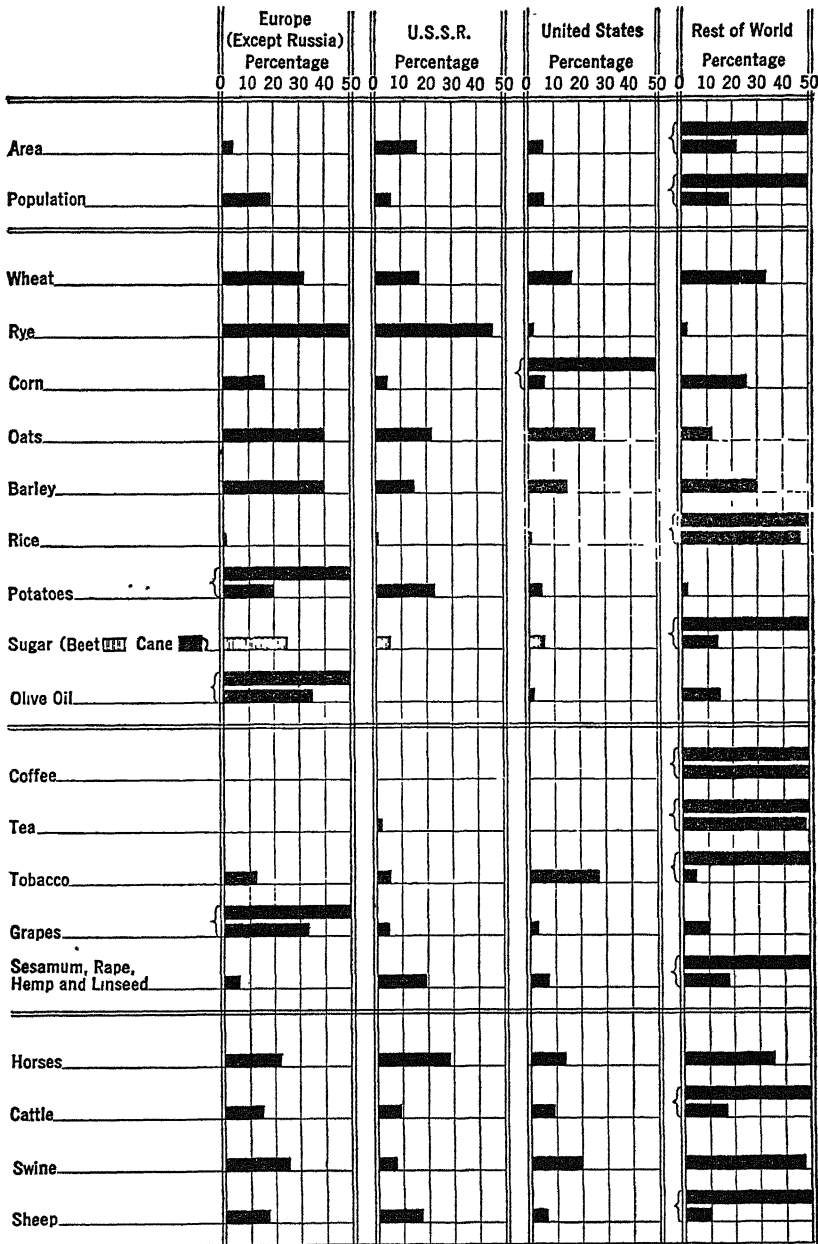
A general concept of this sort seems to be necessary as a framework

in which to set the individual countries. The cultural, economic, and historical contrasts between a country like Denmark or Switzerland on the one hand, and Spain or Russia on the other, cannot be rightly apprehended without a knowledge of geographic and cultural zones and of their relation to agriculture, commerce, transportation, and other human activities both now and in the past. Such knowledge makes it possible to assign to each country an approximate cultural and economic position in relation to any other country. Thus the individual countries and their minor natural regions cease to be isolated fragments. They become living bits of a larger organism.

The Dominance of Europe.—Civilization today is European. The people of the United States, Canada, and Australia all rightly claim to be European in blood and culture. Those of Latin America make the same claim, although with less truth. Japan, China, India, and even Africa are trying to Europeanize themselves as fast as possible, or at least to follow the modified European culture of America. This universal tendency to admire and imitate Europe provides strong evidence that Europe is still supreme among the continents. So the first great theme of this book is the dominance of Europe.

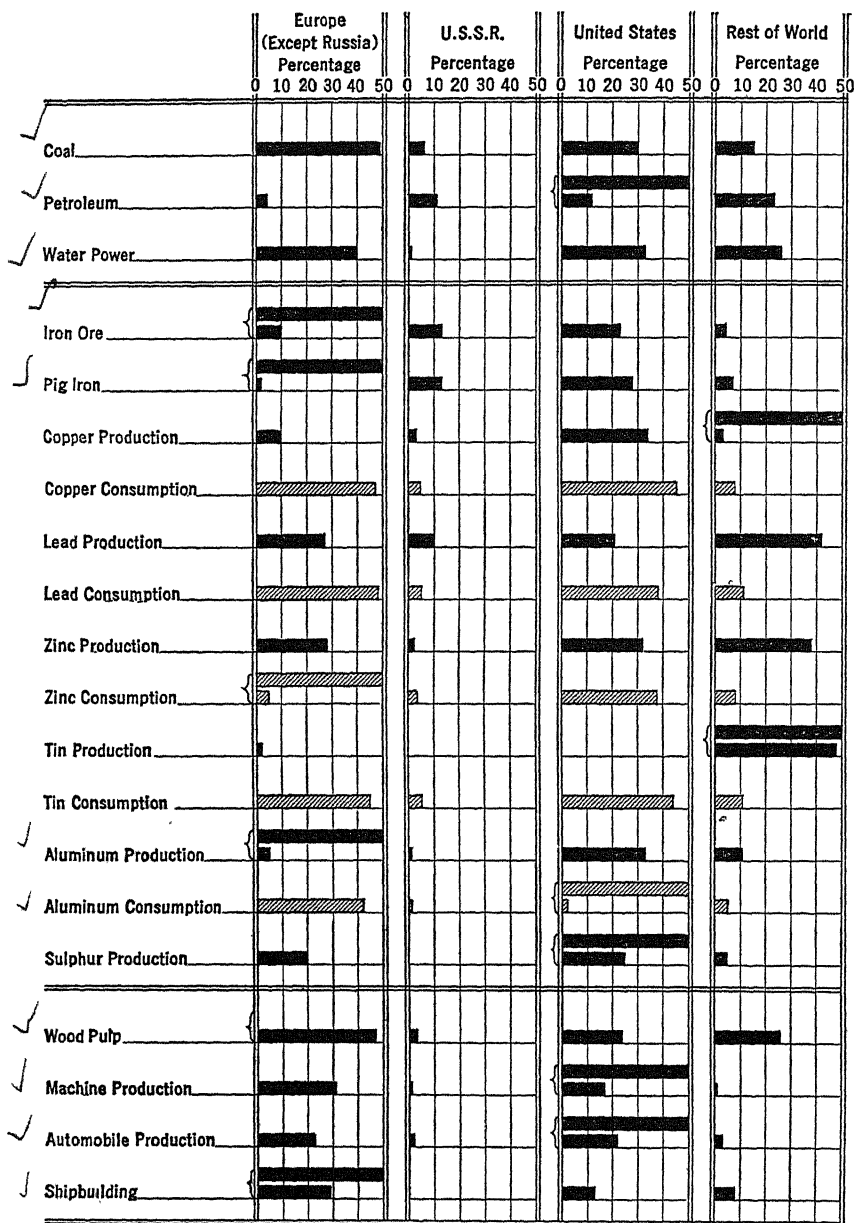
In order to see how great this dominance is, consider some of the main facts. Politically, for example, Europe contains five of the seven great powers. The possessions of European nations in the other continents comprise 77 per cent of the people and 61 per cent of the area of the remaining lands aside from the United States and Japan. Commercially the importance of Europe is equally clear. Judging by the volume of trade between each continent and all the others, Europe's trade is two and a half times that of North America, nearly four times that of Asia, and nearly six times that of South America, Africa, and Australia combined.

In the field of production, as appears in A3-5, Europe holds first place both agriculturally and industrially, although its population is only half that of Asia. By combining more than fifty factors ranging from the production of cereals and manufactured goods to mining and national income, it is possible to make a rough comparison between the present economic productivity of Europe and the United States. If we exclude Russia, the remaining Europeans produce \$100 worth of products for every \$76 worth produced by the 125,000,000 people in the United States. In proportion to the population, to be sure, the productivity of Europe is less than half that of the United States. This is largely due to the fact that Europe, including even such countries as Russia and Norway, is so overpopulated that people cannot acquire capital and machinery and make their work count for



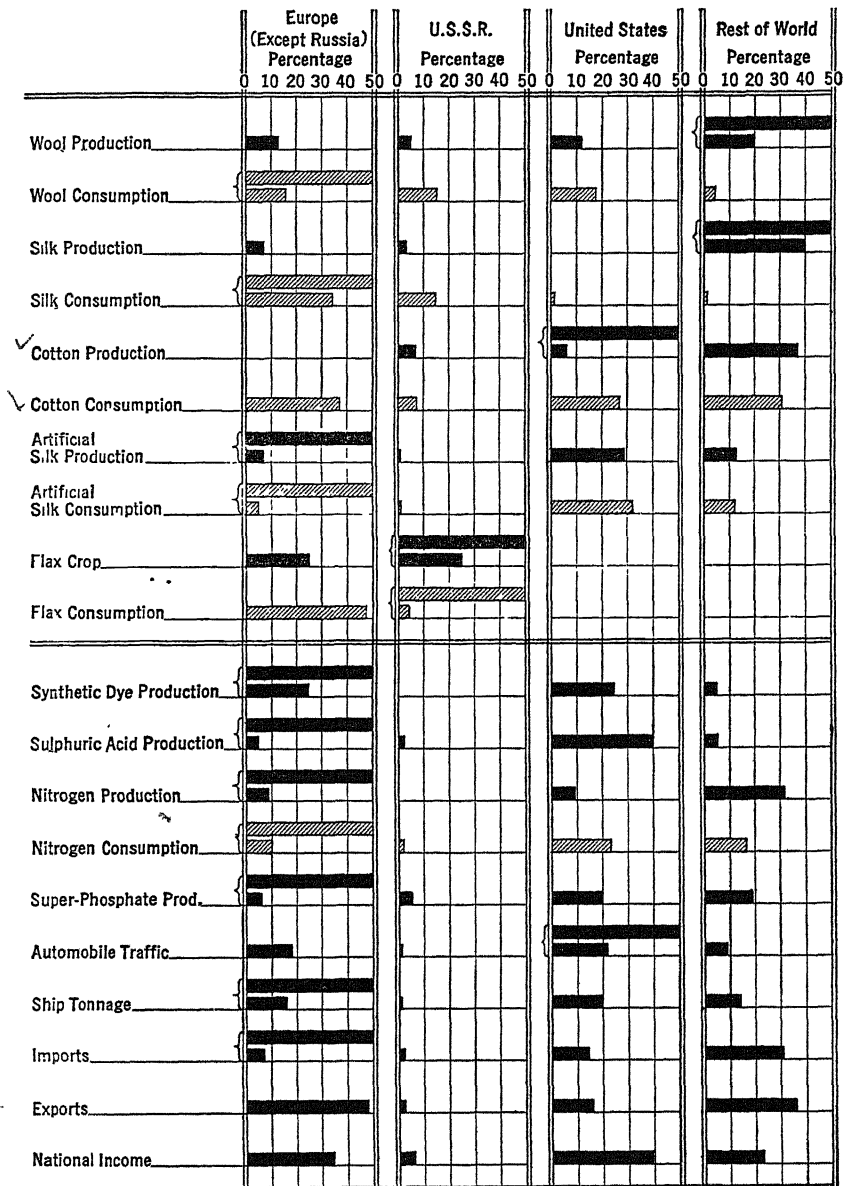
Population. The area and population here shown are those of European Russia, but all other Russian figures are for the entire U.S.S.R. Crops. For crops the years 1929, 1930, and 1932 are used, but 1931 and 1934 are omitted because they were abnormal in Russia or the United States.

A—Share of Europe in Economic Activities.



Coal. The figures for coal include lignite reckoned according to its capacity as fuel in proportion to coal.
 Mineral Products. The figures for mineral products are based mainly on averages from 1931-1933. Except where ore is mentioned
 the metals are given in terms of the amount of metal contained in the ores produced in each region.

A—Share of Europe in Economic Activities.



A—Share of Europe in Economic Activities.

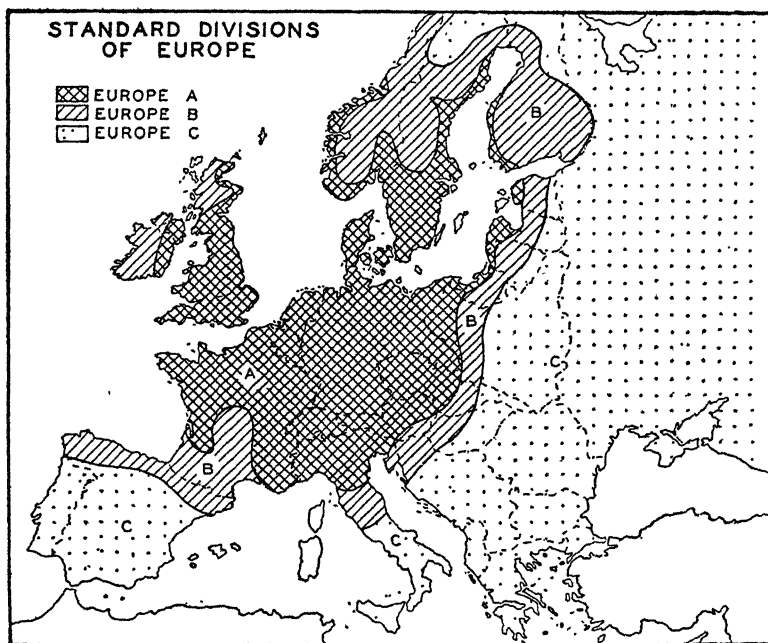
the most as in America. Yet in spite of this, the total value of the production of Europe, including Russia, is well above 50 per cent in excess of that of North America.

In transportation Europe is supreme even though its railway mileage is only about equal to that of the United States and therefore less than that of all North America. But in the habitable parts of the continents where most of the land is used, Europe has more railways per square mile than North America, and far more than any other continent. Its system of navigable rivers and canals is also far better than that of any other continent. In motor transportation, however, it is as far behind the United States as it is ahead in inland waterways. Neither in number of cars nor in mileage of oiled or cement roads can it compare with the United States, although in this respect both regions still have far to go. The tonnage of merchant vessels in Europe shows still greater preponderance. It is two and one-half times as great as that of North America, which in turn is twice that of all the other continents combined. Thus Europe lacks only a little of having twice as much as all the rest of the world put together. A5 shows the relative position of Europe in this respect as well as in many others.

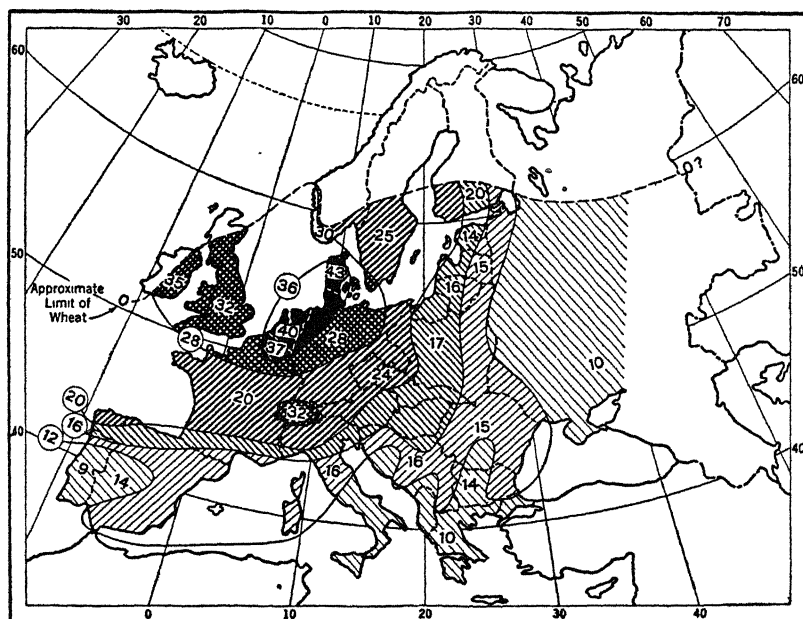
The European facilities for communication are as good as for transportation. About half the world's postoffices are located there. That continent also has 2,700,000 miles of telegraph wire, against 1,850,000 in the much larger area of North America. The latter continent does indeed excel in telephones, but Europe sends far more telegrams. In radio communication, however, the United States, by reason of its wealth, has a greater development, just as in the case of automobiles and airways. On the other hand, Europe prints many more books. Moreover, European books are read in America as well as in the other continents to a much greater extent than those printed in America are used elsewhere.

This last fact illustrates perhaps the most important phase of the whole matter. Although Europe cannot rival the United States in material wealth per capita or in the use of machinery, it still stands unrivaled intellectually. Almost any fair appraisal puts Europe head and shoulders above any other continent in science, art, politics, and literature.

The Diversity of Europe.—The second great theme of this book is the diversity of Europe. Foreigners often speak of Europe as a unit. This is correct in some ways, for many problems belong to the whole continent. The differences between one country and another, however, are enormous. Almost everyone realizes the political, industrial, and



A—Cultural Zones of Europe.



B—Average Annual European Yield of Wheat per Acre, in Bushels, 1910-1929

social contrast between Russia and England, but the contrast between the Swedes and the Portuguese is almost equally great, and is not unlike that between the United States and Mexico. The most notable feature of the European diversity is its orderly distribution, which is illustrated in A7. Surrounding the North Sea three large countries and four small ones have practically the same type of culture, the same general standards of living, and the same high development industrially and socially. The North Sea countries of Great Britain, northern France, Germany, Belgium, Holland, Denmark, and Norway differ only in minor respects. With these may be put Switzerland, northern Italy, much of Austria and Czechoslovakia, Sweden, and a little of Estonia and Finland. All these regions are referred to hereafter as Zone A of the standard cultural divisions of Europe. Their contrast with other countries is illustrated on pages 610-615.

Ireland, northern Spain, southern France, central Italy, northern Yugoslavia, Hungary, Poland, Lithuania, and most parts of Estonia and Finland form a transitional belt, Zone B, where the nature of agriculture, industry, and social and political life begins to assume a new aspect. Still farther from the North Sea a much greater change is found. Spain, southern Italy, most of Yugoslavia, the Balkan countries, much of Poland, and all of Russia except perhaps Leningrad fall to a third level and constitute what we shall call Zone C. Here agriculture loses much of its intensive quality, railways and good roads are scarce, manufacturing is only sporadically developed, and the average income is small. In general the stage of culture is low compared with Zone A, although still high compared with most parts of Africa and Asia.

The dominance and the diversity of Europe both arise from the inextricable interplay of geographic environment, and man's inherent qualities and cultural development. The environment remains relatively constant and sets the general pattern of the distribution of human activities. But the human factors change constantly. New types of people migrate into a region; new ideas are introduced; inventions, discoveries, and wars change man's relation to the world around him; and new needs lead to the use of new resources or to new ways of using old ones. Moreover, man himself constantly alters the environment by clearing forests, introducing new crops and animals, building houses, roads, and bridges, and doing a hundred other things. Thus, though the fundamental features of the geographic background remain essentially the same, their relation to man is constantly changing, and a new story must be told for almost every century.

The Plan of This Book.—The geographic story of Europe can be told in various ways, each of which presents both advantages and drawbacks. (According to the method here followed the continent as a whole is first reviewed in its essential physical, economic, and human aspects.) The physical aspects comprise the location of Europe on the globe, the continent's size and shape, the climate, the relief and scenery and their relation to geological origin, the soil, and the natural vegetation. The discussion of vegetation leads naturally to the human and economic aspects of geography, and especially to land utilization in its relation to the primary industries of agriculture, forestry, and fishing. Then we turn back to another physical aspect of the continent, namely, the minerals and sources of power. Since these are of vital importance to modern industry, they naturally introduce chapters on the development of manufacturing and the evolution of transportation and trade. Next the human stock of Europe is described in terms of ethnographic history as well as of political divisions. Thus we obtain not only a picture of present-day Europe, but also a background for some consideration of the serious problems of overpopulation, international rivalry, and political and social tendencies. This part of the book ends with a chapter on the northwestward march of civilization and man's changing geographic responses during Europe's historic period.

The second portion of the book gives an account of the various countries, classifying them according to the geographic regions into which they naturally fall. It points out the specific application of the generalizations of the first section. In studying each country we shall attempt to discover its most pressing economic, social, and political problems and to see how they are related to the geographic background. Thus we shall summarize the contemporary European situation and see something of what it means in respect to the future.

} **Location.**—One of the most widely recognized reasons for the dominance of Europe is its location. Just as every human being, by reason of his egoistic nature, is disposed to think of himself as the center of the sphere in which he moves, so every country and continent tends to see itself as the center, with the rest of the world grouped around it. (Old maps of the time of Ptolemy are centered around Egypt; Rome in its ancient glory looked upon itself as the heart of the universe.) For outstanding countries like these, this view was essentially sound, because at the time in question they were really dominant. This dominance was partly a matter of favorable location in respect to other active people and to the geographic conditions which at that time were most conducive to the progress of civiliza-

tion. Thus Egypt was located near the line of contact between the parts of Africa and Asia where progress was then most rapid. At a later date Rome was for centuries the geographical center of the Mediterranean world around which civilization had then spread. In the same way, during the nineteenth century, Europe, surrounded by its political and economic vassals, looked upon itself as the center of the world. This is the natural result of historical development, but from the earliest times this development has been influenced by Europe's peculiar location. [The importance of this location depends partly on the accessibility of the continent to other continents and to the oceans. Even more important is the combined climatic effect of the continent's position in respect to latitude, ocean currents, winds, and storms. The dominance of Europe depends more upon climate than upon any other geographic factor; the diversity of the continent is similarly related to the change from a stormy, oceanic climate around the North Sea to a Mediterranean, a continental, or a boreal climate as one goes south, east, or north.]

Location in Respect to Asia and Africa.—Leaving the climate for later study, let us look at Europe's location. The early population of Europe came mainly from Asia and Africa, and the proximity of these continents has always been highly important. After the Ice Age, when the climate became sufficiently mild to melt the glaciers which had covered northern Europe, an almost empty continent was ready for human occupation. Asia was the chief source of immigrants, although the anthropological relics discovered in Europe also display marked African traces. In later times, when the continent was well populated, and when the main lines of present race divisions had been established, the connection with Asia and Africa saved Europe from the disadvantages of isolation which hampered the Americas, and especially Australia. New migrations brought vigorous, fresh inhabitants among whom the weaklings had perished. Even more important, perhaps, is the fact that the cultural and intellectual contributions of these two great continents spread into Europe, thus stimulating its civilization.

The association with Asia and Africa, however, is not so close as to prevent the individual development of Europe. The long zone where Europe joins Asia north of the Caspian Sea is partly a desert, and partly a mountainous country bordered by dense forests and the cold Arctic tundra. Hence constant or intimate relations were long precluded except under the impetus of world migrations. Only in later centuries did Russia extend its influence eastward beyond this border as far as the Pacific Ocean. Farther south the high Caucasus Moun-

tains offer only a few passes, while direct connection between the Balkan Peninsula and Asia Minor is interrupted by the open straits between the Black Sea and the Aegean. The famous Bosphorus, in spite of frequent crossing from the time of the Persians to that of the Turks, remains a barrier, made greater by the dry basin of Asia Minor and the difficult relief of the Balkan Peninsula. Nevertheless, the mutual influence of each continent upon the other has been extensive; the eastern Roman Empire was partly European, and partly Asiatic; the Greeks populated the coast of Asia Minor until they were forced out a few years ago; the Turks still occupy the European shores of the Bosphorus—relics of an empire which might have made Europe subservient to Asia if communication had been easier. Nevertheless, Europe is so separated from Asia that cultural influences have spread more easily than people. "Ideas," as Miss Ellen C. Semple has well said, "are light baggage."

A similar situation prevails even more strongly in respect to Africa. The straits at Gibraltar and south of Sicily have never been great impediments to mutual influence. Sicily was often under African rulers from the great days of Carthage to the period of the Saracens. The Carthaginians conquered Spain, and Hannibal marched from there to Italy by way of France and the Maritime Alps. In later days the Moors inhabited the Iberian Peninsula for centuries, but the wall of the Pyrenees set a limit to their expansion. Outward from Europe, on the other hand, Rome extended her sway into northern Africa, and in recent times the French, Italians, and Spaniards have taken this same region under control. But in Africa the great Sahara Desert prevented the southward advance of Europeans overland until the development of such modern means of transport as caterpillar motor cars and airplanes.

Even today the advantages of Europe's position in relation to Asia and Africa are distinct. The two great continents have served as an outlet for European energy by providing territory for colonial expansion, a market for European products, and a source of raw materials and food. The opening of the Suez Canal made southern and eastern Asia more accessible to Europe. Although Asia now shows signs of a nationalistic awakening with anti-European tendencies, Africa is still essentially a possession of Europe. The commercial and political expansion of western Europe was due in part to Asia and Africa. The difficulties of modern Europe arise partly because it must now share its export markets in India and China with other countries.

Location in Respect to America.—Europe is also advantageously

located in relation to the Americas. / Western Europe faces the economic heart of the United States. The value of this situation has been enhanced by the shortening of the time of transit between Europe and America to four or five days by water and far less by air. / Yet the distance is such that it has permitted independent development of the lands oversea. The breakdown of Spain's former colonial empire, the total loss of what is now the United States by Great Britain, and the establishment of only very loose political connections between Great Britain and Canada indicate that the economic and political leadership of Europe in North America has passed. But this does not lessen the value of a location in western Europe opposite the most active part of North America.

In relation to South America the location of western Europe is as good as that of any other highly advanced region. The distance to Argentina and Brazil from western Europe is not much longer than from New York. Hence the commercial interests of Europe and the United States meet there on an equal footing. Air lines from the United States southward over the West Indies, and from Europe to Brazil by way of northwest Africa, now bring both regions nearer to South America. They intensify the rivalry in the South American market, but do not give either of the northern continents any new advantage of location. In earlier times the distance of South America from the colonizing countries of Europe was a fundamental factor in the loss of colonial control.

Today Europe retains all the advantages of its world location and is ready to use them in the battle to preserve its dominance. Some authorities hold, however, that the location of the United States, facing Europe on one side and the most productive part of Asia on the other, is even better. The true value of Europe's location can be judged only at a later stage of our study when the effect of climate is also considered.

Size and Shape.—The size and shape of Europe also help to make it the dominant continent. / In comparison with gigantic Asia, Europe is almost too small to be accounted a separate continent. A man from Mars would certainly call Europe merely a great peninsula jutting westward from Asia. We call it a continent only because the idea of Europe and Asia as separate land masses became fixed long ago among people who knew only of the separation caused by the Aegean and Black seas and had no idea of the plain which joins the two north of the Caspian Sea. Nevertheless, Europe is so divided from Asia by deserts and mountains, and its character and history have been so diverse, that it is very convenient to call it a continent.

/Size.—The small size of Europe presents decided advantages. In conjunction with the relatively slight breadth from north to south it gives Europe a high degree of unity. Contrast this unity with the diversity of the other continents. In Asia the different centers of civilization have been too far apart to become closely connected; they influenced one another, but remained separate. In Africa the same conditions prevailed. Deserts cut off the center of the continent from the extreme north and south. In the center, dense equatorial forests interpose an almost impassable barrier except by way of the Nile and the eastern upland. Hence North and South Africa have always been greatly separated, and the south remained isolated until Europeans reached it by sea.

/In Europe, on the contrary, the small size, as well as the relief and climate, are favorable to unity through the interchange of people and ideas. Despite the great variety of its political and economic units, as well as of its races and culture, most of Europe has a certain quality which is definitely recognized as European. The much-discussed tendency toward a United States of Europe, or at least toward an economic union, is opposed by no unfortunate geographical factor and is favored by the small size of the continent.

/Shape.—In shape, as well as size, Europe finds an advantage over the other continents. Nowhere else do interior seas, having open connections with the ocean, invade the land so deeply without dissecting it into disconnected islands. Not only do the arms of the sea enter the continent, but nearly everywhere the coastline is bordered by small islands which favor the establishment of settlements and the development of shipping. All around the continent the sea penetrates the land, creating the irregular coastline which offers so many economic advantages.

The Baltic Sea and the North Sea, for example, provide seacoast advantages for all of northern Europe. The medieval Hanseatic League, the beginning of modern commercial Europe, found its reason for existence in these seas. It included seaports near the Baltic and North seas, and inland cities as far as Cologne. Its later growth was due largely to the possibilities of sharing directly in world trade by way of these arms of the sea.

England, separated from Europe only by the English Channel, reaps all the advantages of these waterways. It gets still other advantages because it not only faces the most productive European countries, but has an advanced position in Europe in the direction of North America. Nevertheless the sea has largely freed it from the risk of being involved in continental disorders. Because of these ad-

advantages Great Britain is still the most notable neutral and stabilizing political force in Europe. The Strait of Dover, although crossed by boat in a few hours and by airplane in a few minutes, is still a real factor in Great Britain's isolation. A tunnel might be dug under it if England did not fear so direct a contact. Ireland seems to have many of these same advantages, but its isolation is too great and its importance has declined. This decline, however, is due more to political circumstances and lack of natural resources than to the location and shape of the country.

The climatic effect of the shape of western Europe is even greater than its effect on transportation. The long northeastern trend of the coast from Portugal to northern Norway enables the westerly winds to send a constant flow of warm water along this coast. Thus the winters of western Europe are kept mild, and frequent storms are produced which give rain at all seasons. All this will be explained more fully later. Here we are merely concerned with the way in which the shape of Europe gives to the northwest even greater advantages than to the south. These advantages are increased by the fact that the North Sea and the Baltic, like the Mediterranean and Black seas, carry the oceanic conditions far inland.

The Mediterranean and Black seas, which originally caused Europe to be counted as a continent, bring coastal advantages to all of southern Europe. By way of the Suez Canal they also lead to southern and eastern Asia. Without these seas Europe would have no identity, for it would be a mere fraction of a combined Asia and Africa. Their warm waters were the basis of the ancient Mediterranean civilizations expressed in the rise of Phoenicia, Greece, Carthage, and Rome. To-day they provide the background of the Mediterranean development of France and Italy. They do this not only by affording easy means of transportation, but still more by their effect on climate. Without the Mediterranean and Black seas the whole region from Spain to southern Russia would be desert or steppe. As it is, the so-called Mediterranean type of climate, with its rainy winters and dry summers, penetrates far eastward, even to western Persia and the south side of the Crimean Peninsula. The densely populated and fertile Mediterranean coastal plains, with their subtropical vegetation, their thousands of coastal settlements, their great modern harbors exporting products of the hinterland, and their numerous islands with fishing settlements—all these are the result of a great downfold in the earth's crust which led the Atlantic Ocean so far inland as nearly to connect it with the Indian Ocean. To Europe the Mediterranean is a gift of the gods. This intimate penetration of the sea both north and south

of Europe prevents any part of the continent except Russia from being far from oceanic influences. It tends strongly to produce unity by reducing the contrasts of climate. The nature of the climate in turn has much to do with that of the soil. Thus climate, soil, transportation, and many other conditions are all greatly influenced by the shape of the continent and the intrusion of arms of the sea.

What Europe Is Internally. *The Cultural Zones*—In studying the relation of Europe's dominance to its location, size, and shape we have been looking at the continent as it appears upon an ordinary map. Let us also look inside the continent and obtain some idea of its diversity. The cultured western European who lives outside Europe and views his continent with a far perspective discovers that national differences lose much of their significance. The continent stands out distinctly as a unit, although composed of various political divisions. In Europe he may be French, German, or Scandinavian; away from Europe he is above all European. But if he analyzes his European concept more carefully, he discovers that his idea of Europe and the Europe of the map are not identical. His Europe is the Europe of high intellectual and cultural standards; the Europe of economic efficiency, with well-tilled fields and modern factories; the Europe of big cities, full of vitality, and with harbors teeming with world trade. But there is another Europe which he may not know, or, if he knows, may prefer to ignore, because he is not proud of it.

The French economist, Delaisi, presents this most vividly in *Les Deux Europes*. This book depicts the whole European scene in bare facts not very attractive to the critical eyes of the author's continental contemporaries. Our map of cultural zones (A7) is much like that of Delaisi. It deviates widely in detail, however, since a transitional zone (B) has been added separating culturally high Europe (A) and culturally low Europe (C). The term culture has here a very broad meaning, for numerous factors of wide diversity have been used to fix the final outlines of these zones, and even personal knowledge and observations have been drawn upon in tracing their borders.

An Example of Zone A.—The difference between Europe A and Europe C will be clear if one compares two representative countries, Holland in Zone A and Rumania in Zone C. Holland has a very dense population (see A201) engaged almost equally in farming, manufacturing, and trade. Agriculture is intensive (A 19), the variation in the size of the crops from year to year is low (A116), and special emphasis is given to dairying and truck farming. Although Holland is less industrialized than some of its neighbors (A132), its coal con-

sumption of 1.5 tons per capita is about the European average. Foreign trade is very important, amounting to \$200 or \$300 per capita each year, and the country depends upon imports for more than a third of the goods that it consumes. On the other hand, out of a domestic production worth approximately \$350 per year for every man, woman, and child, about one third is sold abroad, and a quarter of this goes outside Europe. Rotterdam at the mouth of the Rhine, which is economically Europe's most important river, is one of the world's great harbors. Transportation is well organized, with railroads and waterways of equal importance. The average Dutch citizen has a national capital of \$2,300 and an annual income of \$375. Mortality is very low (A22), being 9 or 10 per thousand inhabitants among the population in general, and 50 or 60 per thousand among children under one year of age. This means that the people are healthy, long-lived, and full of energy and vitality. Illiteracy is negligible (B20). Politically Holland is a democratic country, with no revolutions or violence for many generations, and no punishment of politically defeated opponents by imprisonment, confiscation of property, or similar penalties. The country also has large colonies which vie with those of England in being well ruled.

An Example of Zone C.—Now consider Rumania. The density of population is much lower than in Holland although the density of the agrarian population is high (A201). Although agriculture is the main occupation, the yield per acre, or crop intensity, is low (A115), and the variability in the yield from year to year is high (A116). Manufacturing is limited to a few centers (A132) and is mostly of simple types. Coal consumption, amounting to less than a tenth of a ton per capita, is very low; and oil, the main source from which the country might derive power, is mostly exported. The annual foreign trade amounts to less than \$20 per capita, and the country depends on other countries for only one sixth of the products which it consumes. On the other hand, the home production is valued at only about \$90 per capita, or one fourth as much as in Holland. Of this small production only one seventh goes abroad, and of this in turn only a twentieth is sent outside Europe. National wealth (\$600 per capita) is correspondingly low. Although Rumania possesses the outlet of central Europe's greatest river, no harbor of international importance has been developed. Transportation is still inadequate; the railroad system needs reorganization, and the river trade is limited by international jealousies. Mortality is high (20 per thousand inhabitants); and infant mortality is somewhere between 150 and 200 per thousand babies under a year old. Illiteracy

affects about half of the population (B20). Politically Rumania is democratic in name only, with a very unstable government and frequent acts of violence and of political revenge. Not only does Rumania have no colonies, but its own boundaries have changed frequently during the last hundred years and are now for the most part unacceptable to its neighbors and to a considerable number of its own people.

This comparison of Holland and Rumania, despite the omission of cultural and intellectual factors, brings out the tremendous difference between Europe A and Europe C. Of course Europe A is not everywhere so high as in Holland, nor Europe C everywhere so low as Rumania, but the differences are invariably so great that an intermediate zone, Europe B, should be distinguished to prevent A and C from appearing to adjoin each other.

The Countries of Zone B.—Europe B, the transition zone between A and C, contains some sections which closely approach the qualifications of Zone A; some which are truly transitional; and some which are almost low enough for Zone C. ~~Finland~~, for example, although oppressed by Russia for a century, has shown a surprising ability to maintain high standards, and now approaches Zone A in quality. Its culture declines rapidly in the east, however. The part of Poland in Zone B extends roughly from east of Poznan to east of Warsaw. There one sees a gradual transition from prosperous western Poland which was formerly German, to the backward eastern section of the country. A similar transition occurs in Italy between the modern Po Basin and backward Sicily. Most of Ireland except the manufacturing strip from Dublin to Belfast and Londonderry is not yet up to the requirements of Europe A, although it is progressing.

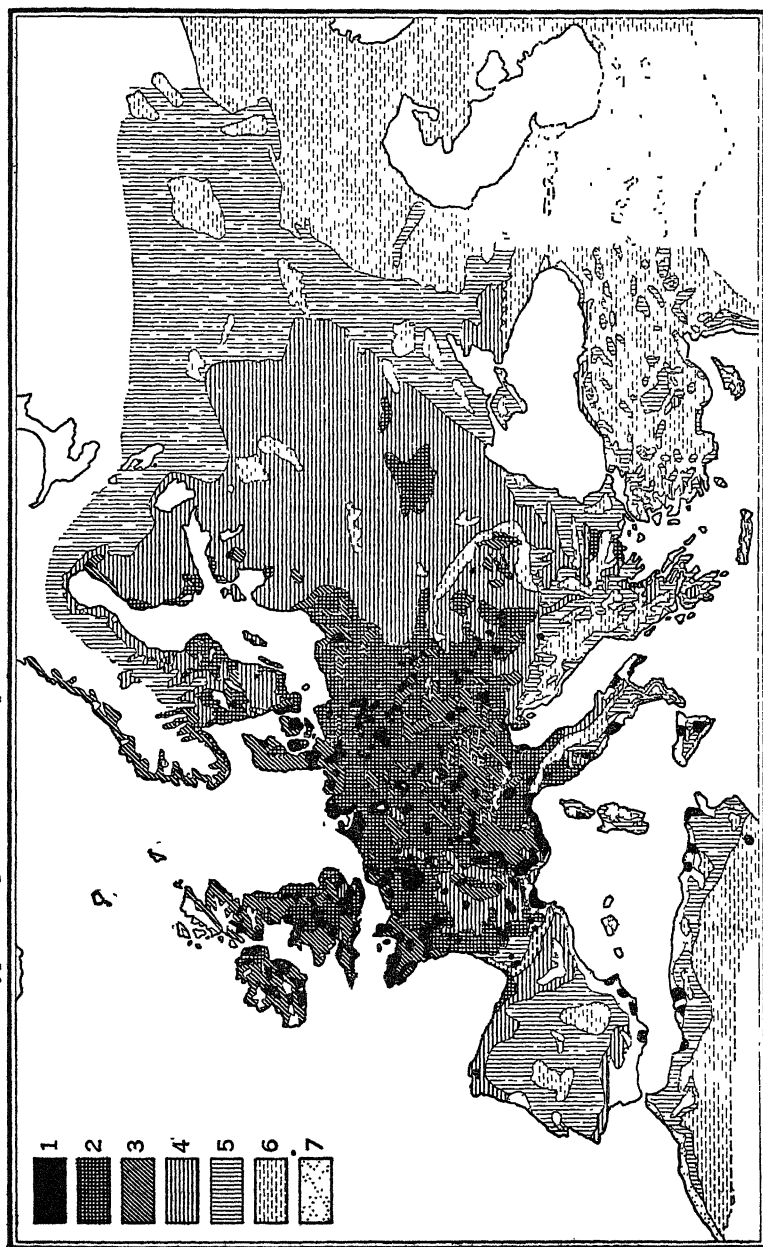
The Basis of the Cultural Zones of Europe. (a) *Agricultural Maps.*—The character of these cultural zones is illustrated by sample maps of various kinds. B7 shows the average annual yield of wheat per acre for 20 years. Around the North Sea the yield exceeds 30 bushels per acre, and in practically all parts of Zone A it exceeds 20. Zone B shows a rapid decline, while in Zone C the yield rarely rises above 15 bushels and is generally less than 12. Similar maps for other crops show practically the same features. Almost every crop that can be raised in the North Sea region shows there its highest yield. This is notably true of potatoes, rye, oats, and other staples. Crops like corn, grapes, and olives, which do not thrive in the cool North Sea climate, show their highest yield and best quality close to their northern or western margins, and deteriorate as one goes farther from the North Sea.

The situation is summed up in A115 showing the intensity of crop production, or average yield per acre when each main crop is weighted according to acreage. Belgium stands highest, having 178 per cent of the average for all Europe. An index number of 89 in Poland means that the Polish farmers get only half as much per acre as do those of Belgium. This map looks very much like those of cultural zones (A7), yield of wheat per acre (B7), prevalence of trade and transportation (A21), and farm income per man (A119). The line for an intensity of 125 in A115 almost follows the border of Zone A in A7, and 100 lies not far from the outer border of Zone B. If the maps of national income (A20) and illiteracy (B20) were shaded according to isopleths, or lines separating areas where the income, for example, is respectively above or below a certain level, they would look much like A115.

Another evidence of the reality and nature of the cultural zones of Europe is seen in A19 prepared by the Hungarian geographer, Count Teleki. This map omits the forests and waste areas, and shows the way in which the rest of the land is used for agriculture. The dark areas are regions where the most intensive and careful types of agriculture prevail. Aside from a few outliers they are almost identical with Zone A. Around them is a transitional zone of moderately intensive agriculture corresponding to Zone B but wider. Then come broad areas in Zone C where the prevalent type of agriculture is the extensive kind, grain being planted without special cultivation, and herds and flocks being kept for meat and wool rather than milk. Curiously enough the acreage cultivated per farm family decreases from the North Sea region of intensive agriculture to the peripheral areas of extensive agriculture (A19). Thus in the regions where the fields are most productive, the farmers cultivate the most land per man. In most of Zone A the cropped area is 20 to 30 acres per farm family. On the other hand, it drops to less than 12 in much of Zone C. Moreover, the farm animals deteriorate in size and quality as one goes away from the North Sea. The result is that the real income of the farm families in Zone C is only about half as great as in Zone B and a quarter as great as in the central part of Zone A (A119).

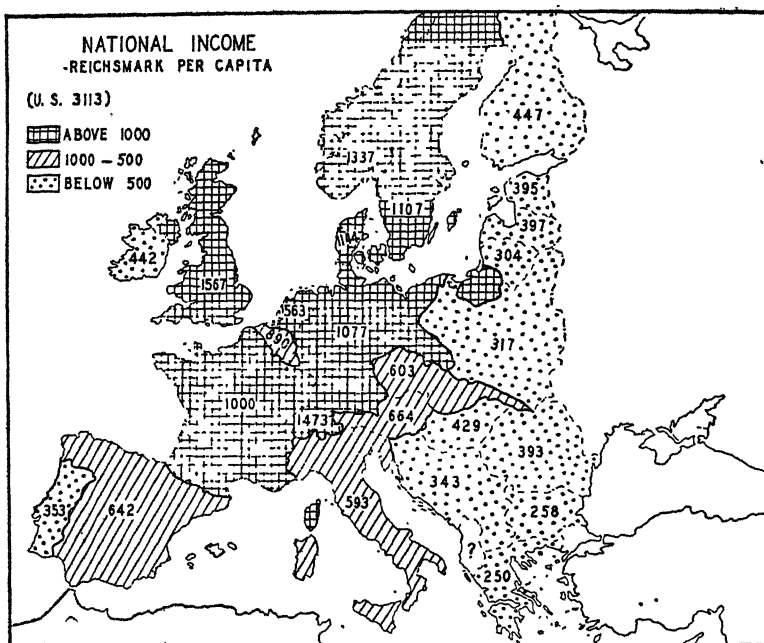
(b) *Other Economic Maps.*—Other occupations also show zones. A21 indicates that at least 12 per cent of the workers in Zone A are engaged in trade and transportation. In Zone C, on the contrary, the percentage drops to less than 8/ except in Greece and Portugal where many good harbors strongly promote these occupations. Although this map differs in some respects from the others, the location of the transitional zone is everywhere approximately the

A—Types of Agriculture in Europe. (After Count P. Teleki and Dr. F. Koeh.)

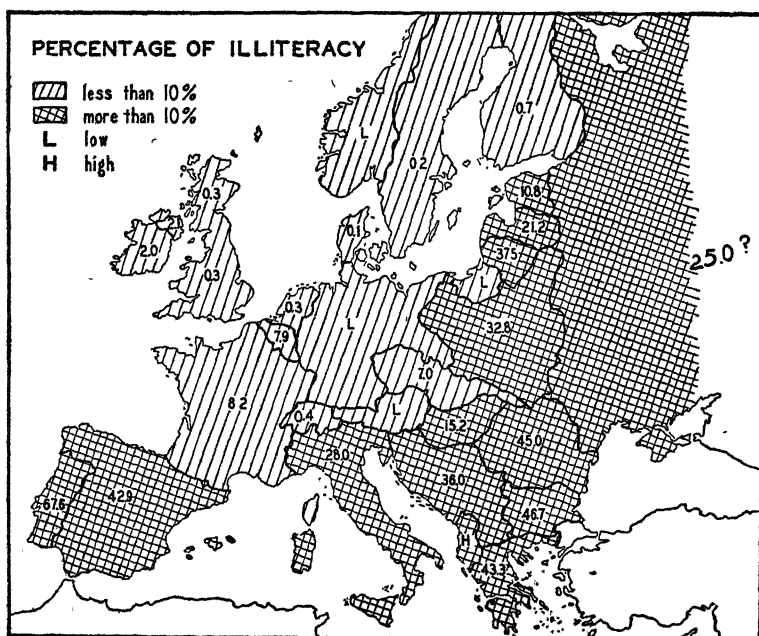


1. Horticulture (market gardens, vegetables, flowers, fruit, and milk).
2. Intensive agriculture.
3. Intensive animal industry (dairy-ing).
4. Agriculture of medium intensity with moderately intensive cattle raising.
5. Extensive agriculture.
6. Extensive cattle raising.
7. Intensive Mediterranean agriculture and tree crops.

Use of the land for forests is here omitted. The map shows conditions as they were at the time of the Great War.
 Since that time the area of intensive agriculture has spread somewhat along its eastern margin.



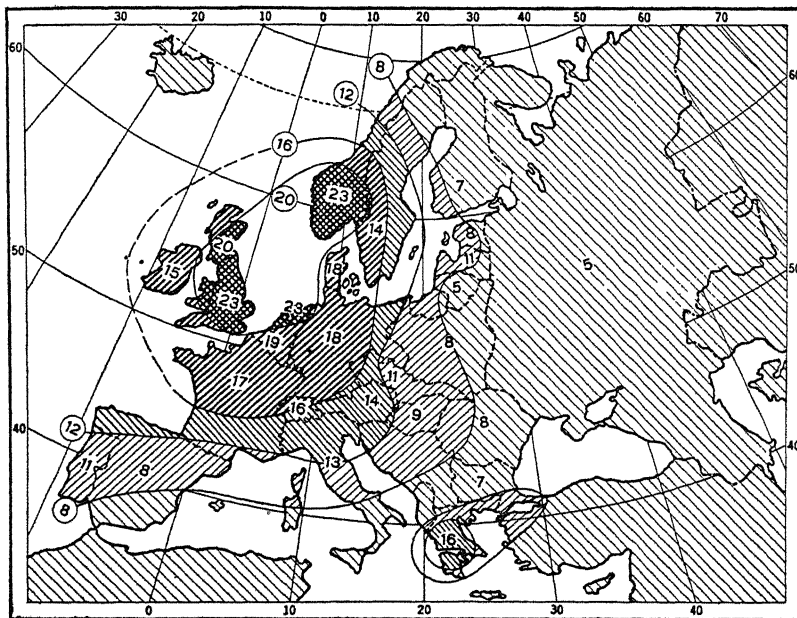
A—National Income per Capita 1928.



B—Illiteracy in Europe.

same, as is true of many other maps, such as A159 showing how many persons there are for each *passenger automobile*, not counting buses and trucks. In Zone A there are from 40 to 100 or more; in Zone C from 500 upward. Passenger cars, which are used mainly for pleasure, are a good measure of the wealth of a country.

Another test of the matter appears in A20 showing annual income per capita. Here the figures are given in German marks which were worth about a quarter of a dollar when the map was made. Zones A and C are clear. Zone B can also be detected. It would stand out very clearly if this map were based on isopleths instead of national



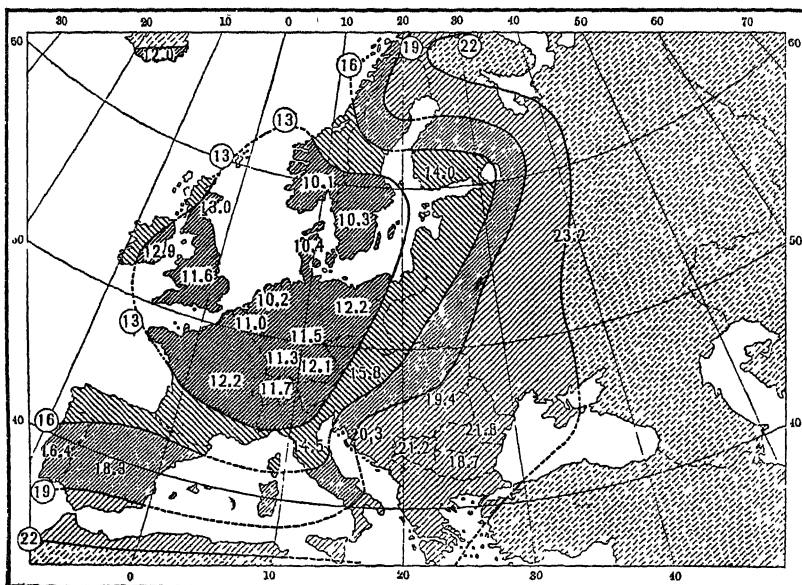
A—Percentage of European Men Engaged in Trade and Transportation

boundaries. In that case the contrast between the richer north and poorer south in Spain and Italy, and between the richer west and poorer east in Czechoslovakia, would be apparent. Even as the map stands, however, it is evident that in countries like Greece and Bulgaria the average income of all classes is only a quarter to a sixth as great as in Zone A, and the same is true of Russia.

(c) *Maps of Cultural Conditions.*—Three other maps illustrate the diversity of Europe in the less material phases of life. A157 shows that in Zone A the average person, including women and children, makes 10 to 40 journeys by rail each year. In Zone C this sinks to only one or two. In B20 we see that in Zone A practically all the

people over 10 years of age can read and write, whereas in Zone C a third or even a half are unable to do so. Russia, however, claims that her people have now improved so much in this respect that they are at least as literate as countries like Hungary which represent Zone B. But even in Russia there is a great decline in literacy from west to east.

Health, like education, may be both a cause and a result of economic prosperity. If people feel vigorous, they work hard and tend to prosper. If other conditions make them prosper, they become better educated, have more money to spend, and pay more attention to their health. Regardless, however, of which of these relationships is more important, A22 shows that the zones of health are like those of agriculture and of other economic and cultural conditions. Many other maps show this same general tendency. Taken together they



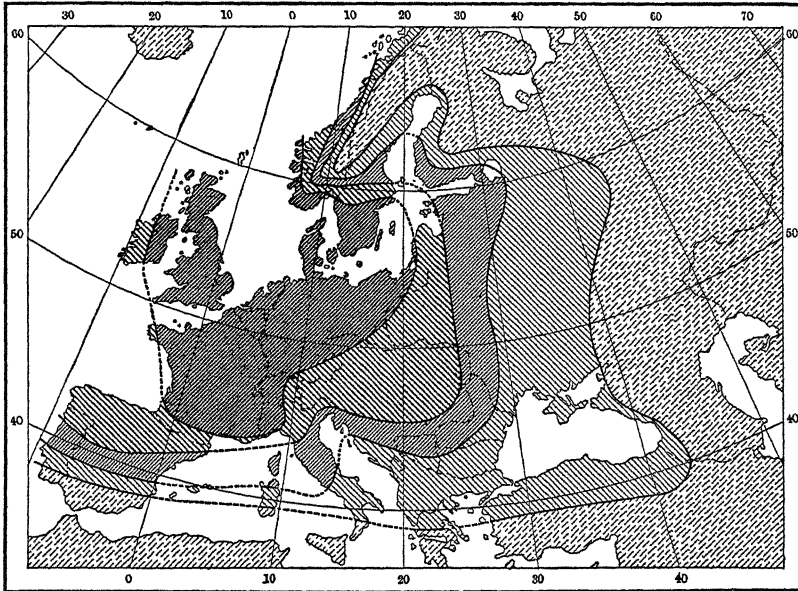
A—Health in Europe. (Standardized death rates.)

make it clear that almost every favorable phase of human activity rises highest in Zone A, diminishes toward the south, east, or north, and falls lowest in Zone C. Thus in its internal structure Europe is highly diverse. The dominance of the continent is largely due to Zone A with its center in the North Sea countries.

CHAPTER II

CLIMATE

Geographic Factors in Relation to Zones of Culture.—The zonal distribution of human culture in Europe seems to owe its pattern to geographic factors. Among these factors relief appears to be of only minor importance, for mountainous Switzerland as well as the lowlands of Holland belong to Zone A. Neither can the soils be a dominant factor in determining the pattern of the zones, for the soils are generally poor and leached in Zone A, whereas Zone C, especially in Russia, has large areas of the best soil in the world. Neither can



A—Climatic Efficiency in Europe.

sources of power and mineral resources be held responsible. In most cases their development came long after the general outlines of the zones had been established, and was primarily a response to the energy of the population. The long coastline, the many arms of the sea, and the many inland waterways are certainly an asset, but they appear to be as favorable along the Mediterranean and Black Sea coasts as along that of the Atlantic.

Thus relief, soil, minerals, sources of power, and waterways are all eliminated as major factors in determining the geographic forms of the cultural zones. The only other possible physical factor is climate. That this is really the main factor is indicated by the way in which the map of zones of culture agrees with a purely climatic map (A23). This map indicates the degree of energy or efficiency which people of the European type would have in different parts of the continent if their efficiency depended solely on climate. It is based on studies of the amount and quality of work, both mental and physical, which is done under various conditions of weather. Since A23 is a purely physical map it cannot possibly be influenced by man's activities. Therefore, the resemblance between the map of climatic efficiency and the map of cultural zones either must be accidental or must mean that climate is a major factor in determining the location and shape of the zones.

That this is the case is also indicated by A22, showing the distribution of health. People have good health in the places where the climate is of the kind that also goes with efficiency. Such an agreement between climate and living beings is not confined to man, but is also found in animals and plants. This appears in B7 showing the yield of wheat per acre. Thus the maps of human health, yield of crops, and zones of culture are all essentially alike, but none of them pays much attention to the distribution of relief, soils, minerals, sources of power, or location in respect to waterways. All of them, however, are almost duplicates of the purely climatic map showing the degree to which climate promotes efficiency. The inference is that this agreement is not accidental, but indicates that climate is the main factor in the geographical distribution of human culture.

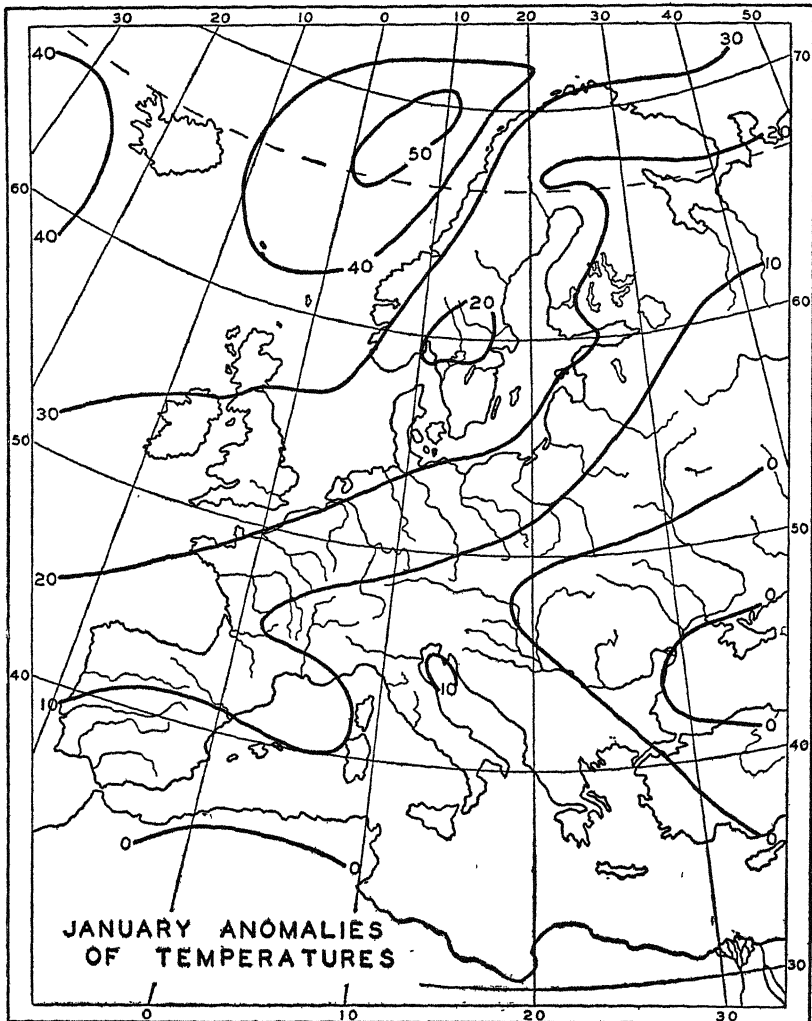
The Climatic Advantages of Zone A.—The climate of northwestern Europe—that is, of Zone A—combines many factors which are highly favorable to human health and activity. These include (1) comparatively mild winters and cool summers, (2) a sufficient rainfall distributed fairly evenly at all seasons and with little variability from year to year, and (3) a constant sequence of cyclonic storms which prevent climatic monotony and provide the constant changes of weather which are so valuable as stimulants of human energy. No one would select this climate because of its pleasantness; its strong winds, prolonged cloudiness, and dreary rainy days are often a despair to the American visitor. But such a climate is by no means bad for agriculture. In fact, the abundance of moisture at all seasons and the lack of extreme cold in winter or heat in summer make it very favorable. Far more important is the fact that now that the in-

habitants have solved the problem of protecting themselves from its inclemency the climate gives them the stimulation which has been one of the main factors in permitting Europe A to have such a remarkable historic development, and to rise so far above the rest of Europe and above most other regions.

Europe C is more complex in its climatic structure than Europe A. It combines the delightful climate of southern Europe with the continental climate of eastern Europe and the coldness of the Arctic. All of these have in common a relatively weak cyclonic control, and hence a comparative lack of regular changes of weather. But this is not the only disadvantage, for each part of Zone C has its own special kind of climatic extremes. The north, being too remote to be much influenced by the warm waters of the Gulf Stream, has too short a growing season and too long and dark a winter. Eastern Europe experiences the grave disadvantages of continentality which are greatly accentuated in Siberia. The long severe winter with very little precipitation and yet a great deal of cloudiness is bad for both crops and man. In the cooler countries all over the world the highest deathrates and lowest ebb of human efficiency are found in cold, dry weather such as is strongly characteristic of the continental interior which forms a large part of Zone C. Then, too, the summer rain is scarcely sufficient in view of the comparatively high continental temperature at that season. Since the amount of rain also varies a great deal from year to year, and there is much danger of drought, agriculture suffers as well as man. In southern Europe the main disadvantage is the summer. There a rainy and productive winter is combined with a long, hot, dry summer in which man's energy is diminished, and economic activity languishes until the fall rains start again.

The Main Climatic Factors.—The favorable climate of Europe A and the decline in desirable characteristics elsewhere depend on a few main factors. (1) Europe possesses the decided climatic advantage of being located between 35° and 70° N. on the west side of a continental mass. (2) Therefore, it is in the zone of prevailing westerly winds and in the part of the continent where such winds are most effective. The dominating westerly winds, characteristic of this latitude, bring marine influences far inland, softening the severity of the winter and diminishing the summer heat. The Gulf Stream, a gift from the tropical parts of the North Atlantic, increases the beneficial influences of the ocean, bringing heat from equatorial regions far into the Arctic Ocean. Thereby it causes a winter anomaly of as much as 50° F.—that is, it makes the temperature of northeast Iceland 50°

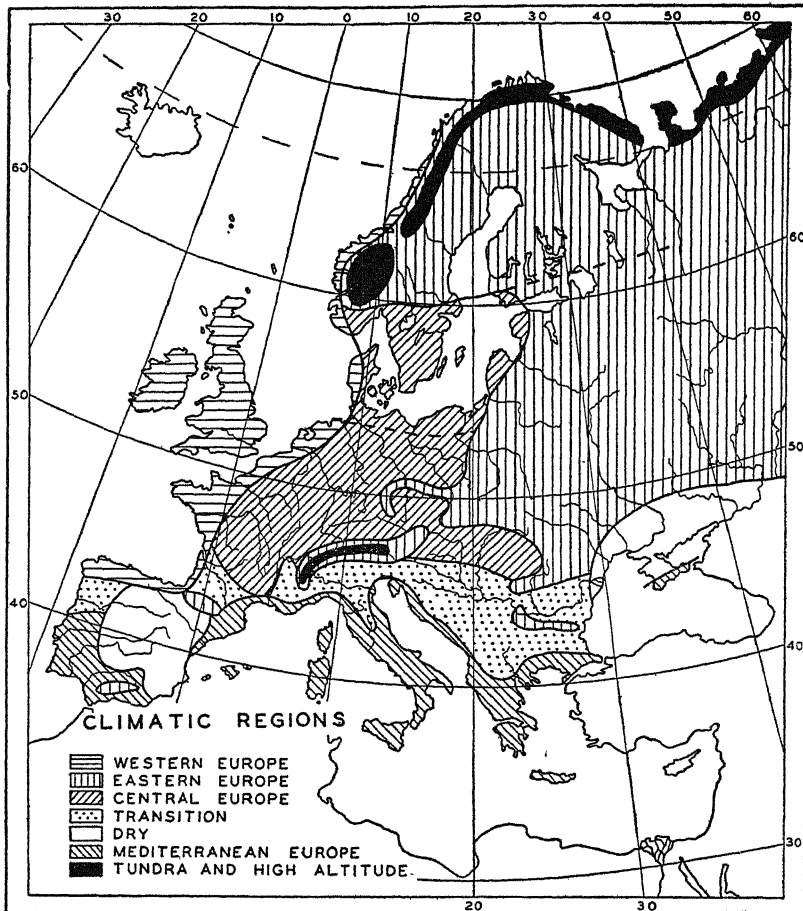
warmer than the average of all regions in the same latitude (A26).
 (3) Another influence also comes from the west; namely, a sequence of cyclonic storms. Born of the contact between cold Arctic and



A—Winter Anomalies of Temperature in Europe. Only in southeastern Russia and Africa do isomolous lines of zero indicate that the winter temperature is as high as the average for any given latitude.

warm subtropical air in the main zone of cyclonic activity, these storms whirl over the Atlantic and bring a climatic instability which is of outstanding value to human energy and consequently to progress.

Climatic Regions.—Europe may be divided into climatic provinces on the basis of the degree to which each of these three factors is favorable to man and his activities. A27 shows three basic types of climate. One is the *Western European*, or more marine type, prevailing along the Atlantic shores from Spain to northern Norway and



A—Climatic Regions of Europe.

including the British Isles. The second is the *Mediterranean* type, which is also more or less marine and extends from the Atlantic Coast of Portugal through the entire Mediterranean area to the Crimean Peninsula. Third comes the *Eastern European*, or continental type, with which, for the sake of simplicity, may be placed the climate of the main European mountains. Between these three types are two

zones of transition. One is the *Central European* type between the Western and Eastern types. The other is the *Southern Transition* type farther south, representing the transition from the climates farther north to the Mediterranean. To these five regions must be added not only the dry *Steppe climate* of the Iberian Peninsula, south-eastern Russia, and bits of Turkey and Greece, but also the *Tundra climate* of far northern Europe, and of some of the highest mountains.

① *Western Europe*.—The climate of western Europe is typically marine. Mild winters, in which freezing periods are rare, are followed by cool summers. The differences between the average temperatures of summer and winter are small, ranging from 15° F. on the western border to 30° on the eastern. The average temperatures approach those most favorable for human health, and regular cyclonic storms add the variety which stimulates productivity. The growing season is scarcely interrupted by winter in the more marine coastal sections, and even inside the Arctic Circle the frost period is scarcely longer than 100 days. The precipitation is regular, and well distributed, with a tendency toward a late fall or winter maximum. It is heavy on some mountain slopes and moderate in the lowland sections, but everywhere sufficient. One unpleasant factor in the weather is the generally strong winds, often reaching the force of gales during the winter months. Others are high humidity, and a high amount of cloudiness and fog with a consequently low percentage of sunshine, especially around the North Sea and the English Channel. Although the latitudinal factor is not of major importance, the disadvantages of an Arctic location are evident in the depressingly dark winters and long exhausting summer days of the extreme northern part. On the other hand, in the south, especially on the north coast of Spain, sub-tropical influences show themselves in relatively high temperatures and much sun.

As a whole, this marine Western climate stands out as one of the world's most favorable types. Western Europe's high rank in health, energy, productivity, and culture is certainly not a passing whim of history, but is based on a sound climatic foundation.

② *Eastern Europe*.—The main feature of the climate of eastern Europe is its continentality, although even here marine influences are easily recognizable in contrast to the more continental Asiatic regions farther east. This continentality shows itself in long, cold, dry winters and short, warm summers during which the inblowing monsoonal winds bring humidity and rainfall in the form of convectional showers. In winter the influence of the Atlantic shows itself in high cloudi-

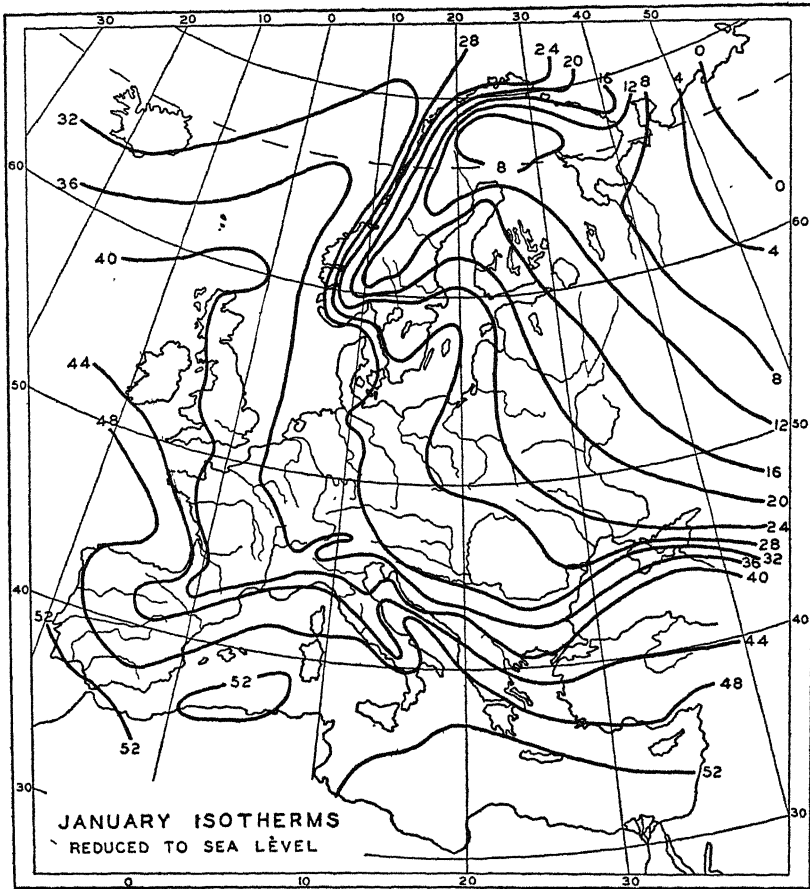
ness; the region northeast of Moscow being cloudy more than 80 per cent of the time. The oceanic influence is also evident in an occasional invading storm causing a light snowfall which nevertheless remains on the surface for a long time. Rivers, lakes, bays, and gulfs are frozen in winter, and the frost period nearly everywhere exceeds 150 days. If we subdivide the East European climatic region, the northern section shows not only the effects of latitude in producing low temperature, but those of its position on the leeward side of the Scandinavian uplands, giving rise to low rainfall. The dividing line between the northern and southern sections is determined partly by vegetation, for it separates the coniferous forests, or Taiga, from the region farther south where utilization of the land for agriculture is widely possible.

The western boundary of the southern and main section of the Eastern climatic province is the January isotherm of 27° which swings nearly north and reaches the Baltic Sea near Riga (A30). This isotherm has been used by Köppen, the great authority on climatic regions, to separate his warm temperate climate from the boreal climate with its intemperate winters. This same isotherm surrounds the more important central European mountains, the climate of which otherwise approaches that of the general region in which they are located. It does not show on A30 because there the isotherms are reduced to sealevel; that is, they show what the temperature would be at sealevel. Among the mountains the Alps stand out not only because of their abundant precipitation with a summer maximum, but also because of winter conditions which are rather unusual for central Europe. At that time, as is shown below, the high-pressure axis of Europe is responsible for clear, sunny, comfortably mild weather on the upper mountain slopes, while the lower parts feel the raw unpleasantness of thick fog.

Coming back to eastern Europe, the climate has a very good feature in the warm summers when the precipitation is at a maximum. Unfortunately the rainfall is so low as to be close to the danger line for agriculture, and its unreliability often causes distress. Moreover, the long dreary unproductive winter causes the unfavorable features of the climate to prevail over the good ones. From the climatic point of view this makes eastern Europe decidedly inferior to the regions farther west.

3. *Central Europe.*—The climatic region marked as Central Europe is primarily a transition area between the thoroughly marine climate of western Europe and the thoroughly continental climate of eastern Europe. Therefore, at the two extremes it includes climates as diverse as those of central France and the Hungarian plain. Different as

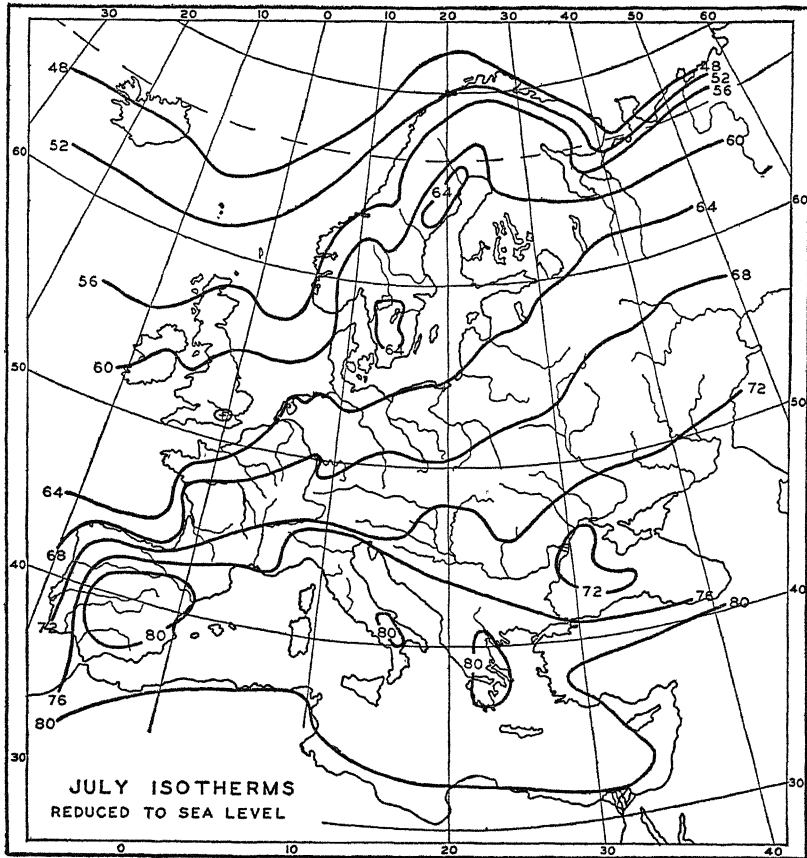
these are, their general characteristics show enough similarity to make them parts of a climatic region that can easily be recognized. Thanks to Atlantic winds the winters are relatively mild even in the east. This is true in spite of the fact that cyclonic storms passing through the northwest of this region cause an inflow of more continental air



A—Winter Isotherms in Europe.

so that spells of cold, clear winter weather interrupt the cloudy, mild, marine conditions. The summers are much more continental than on the coast, and the range of average monthly temperature from the warmest to the coldest month varies from 30° to 50° F. Precipitation is heavy on the mountain slopes and moderate elsewhere, but always adequate. It is rather well distributed through the year, but

with a pronounced summer maximum showing the influences of monsoonal continental conditions. Snow may cover the ground for a considerable period, especially in the eastern part of the region, and the frost period varies between 70 days per year in the west and 150 in the east. The marine influence of the Baltic and the greater frequency of cyclonic storms in that region make it necessary to distinguish a

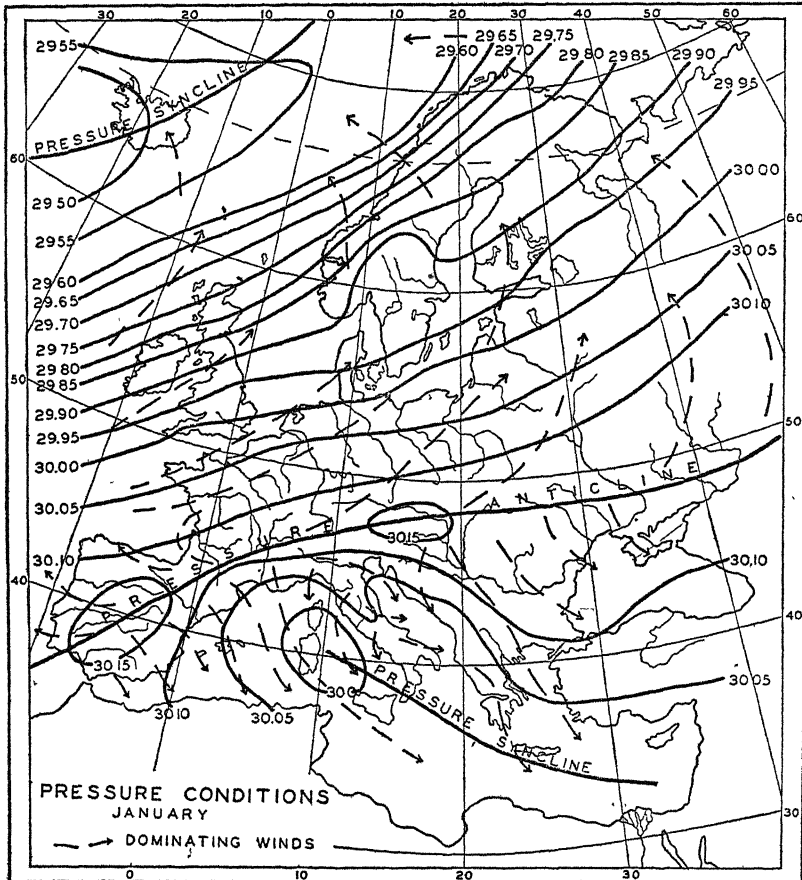


A—Summer Isotherms in Europe.

Baltic subtype of climate. This Baltic littoral climatic region extends northwards to a latitude where the Scandinavian Highlands prevent the westerlies from having much influence, but includes southern Finland/(A36).

In most respects mankind finds in this Central European climate another favorable region. Weakened cyclonic variations are balanced

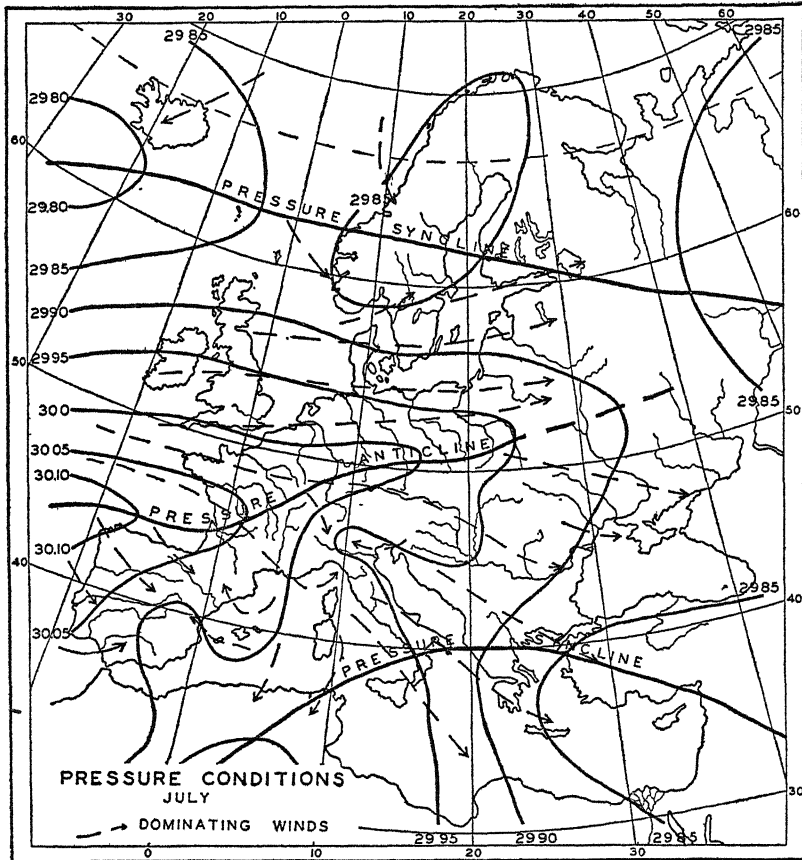
by greater seasonal differences, although these go too far in the eastern portions. The temperature is rarely extreme, and the precipitation is usually adequate. The main unfavorable point is the increasing length of the frost season toward the east and north, but this interrupts the sequence of work only a little, since preparation for the spring season requires most of the farmers' free time in winter. Here,



A—Winter Pressure and Winds in Europe.

as in western Europe, the climatic conditions are excellent for human progress, and it is not surprising that high cultural standards prevail. Nevertheless, we must not overlook the decline towards the east. Western Poland and Hungary, for instance, do not have the advantageous climatic foundation that the more western sections of this region enjoy.

4. *The Mediterranean Region.*—The climate of this part of Europe is decidedly different from the ones thus far described. The main difference is the shift of the unproductive period from winter by reason of low temperatures in the north to summer by reason of drought around the Mediterranean. The winters are delightful, with mild temperatures and sunny weather, occasionally interrupted by cloudy



A—Summer Pressure and Winds in Europe.

days and rain. The rainfall in general is fairly abundant and increases on the western slope of the mountains, attaining the European maximum on the Dinaric Alps. The winds from the European continental axis of high pressure are comparatively cold, and cold waves with snow may invade the Mediterranean region as far south as Rome and Athens. Nevertheless, in most places the growing season is con-

tinuous throughout the winter. These favorable conditions are even more pronounced during the spring and fall when increased insolation and at least moderate precipitation provide unusually good conditions for crops. The summers, however, spoil the chances of this region for honors as perfect in climate all the year round. The regular northerly etesian winds bring no moisture; from the cloudless sky the high sun scorches the land, and except where water is available for irrigation nature can no longer be productive. The length of the dry summer period increases from north to south, as does the unreliability of the rain. Both factors strongly limit the climatic possibilities.

From the human point of view the Mediterranean climate is certainly attractive, especially where the summer drought is not severe. Protected by mountain walls from the cold winters of more northern Europe and with winter temperatures close to those of maximum human energy, the sunny Mediterranean shores were once the cradle of world civilization. This was before man had conquered the more severe northern climate and learned unconsciously to gain the benefit of its great variability. The population of the Mediterranean lands is still dense and the general culture not inferior to that of the times of world supremacy, but the dry, hot summers are too great a handicap. So the Mediterranean as a region of human efficiency is surpassed by the north and suffers consequently by comparison, in spite of its many advantages.

5. *The Southern Transitional Region.*—On the southern edge of the Central Plateau of France, a transitional zone separates the Mediterranean climatic region from the climates of western and central Europe. This zone is not continuous. It is interrupted by the dry region of Spain and by a projection of the Central European climate in the Cevennes. It is also reduced to a width of only a few miles where the French Alps approach the sea in the Riviera.

The main part of the transitional zone separates the Mediterranean climate with its winter rain from the Central European climate with its summer maximum. The result is rather favorable. Precipitation occurs throughout the year with a tendency toward a double maximum in the spring and fall. The temperature combines the winter mildness of the south with the milder summer heat of the north. A gradual shift, however, takes place from west to east. In the west the Po Basin is the best example. Cold air flowing from the Alpine high-pressure area makes the winters fairly cool, but the frost period ranges only from 30 days on the Adriatic shore to 75 at Torino. The rest of the year has warm to mild temperatures and an abundance of rain. These balance the disadvantage of a relatively high variability

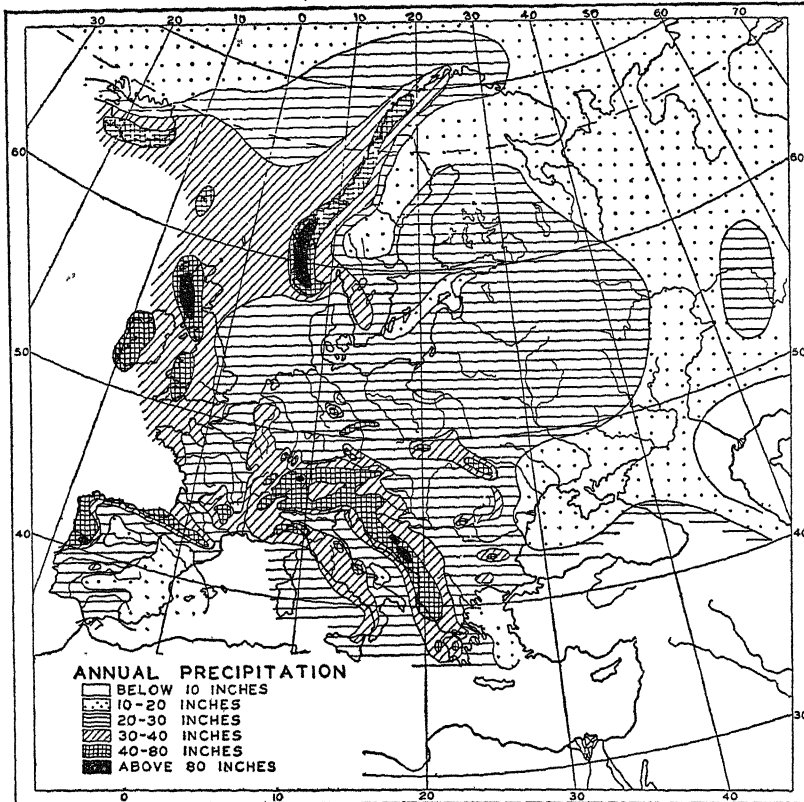
of the rainfall from year to year. /Adding to this a greater activity of cyclonic storms than prevails in the Mediterranean type, we find an excellent climate for human occupation. It has shown its excellence from the times of the Roman occupancy through the Renaissance up to the present period when the Po Valley stands in the forefront of modern Italy.

Farther east the southern transitional zone shows the disadvantages of continentality like that of the regions to the north. The winters in the Hungarian plain and in Wallachia are severe with a frost period of more than 100 days. The summers are hot, and the rainfall, still showing a tendency toward a double maximum in spring and fall, declines in quantity. This fact, together with the unreliability of the rain, introduces a seriously dangerous factor in human activity. This danger becomes more pronounced towards the east until finally the dry region of southern Russia is reached. For man this climate has the promise of a productive summer with sufficient rain, but it also brings the danger of drought and starvation. /Lacking the cyclonic stimulus because of its continental position, it belongs to the more unfavorable climatic zone of Europe, although ranking above the eastern part of the continent.

The Portuguese section of this transition zone is different from the rest. It is the only place where there is a direct transition from the Western type of climate to the Mediterranean. The rainfall is abundant like that of the regions north of it. There is only a very short dry summer season, and the temperatures in winter as well as in summer are fairly high. This makes a rather ideal combination, although the cyclonic control is considerably weaker than farther south. Theoretically, the climate is rather favorable for human activity, but although it represents the best part of Portugal, the development of the people is rather disappointing and not what might be expected from the climate.

6 /*The Dry Regions of Europe.*—Insufficient precipitation occurs mainly in three parts of Europe, first in inland basins which open upon the eastern coast of Spain south of Barcelona, second in the eastern Attic portions of Greece—a very small area—and third in southern Russia. In both Spain and Greece mountains shut out the rain-bearing winds from the Atlantic or Mediterranean. Moreover, on the Mediterranean coast of Spain the winds in winter are mainly from the west while in summer the onshore winds become warm when they blow over the heated land and bring moisture only to the higher mountains. This Spanish dry region is irregular in shape since the many mountains receive more precipitation than the lowlands, but

their influence is omitted in A27 in order not to make the map too complex. Southeastern Russia owes its low rainfall—less than 10 inches per year—to its distance from the Atlantic. The effect of the Black Sea is very limited as the winds are mainly from the land, and on the north side of the sea only the southern slopes of the Crimean Peninsula have the benefit of a Mediterranean climate. The Iberian



A—Annual Precipitation in Europe. Absence of shading has no significance outside of Europe.

Plateau, as well as southern Russia, shows strong continental characteristics in the form of cold winters and hot summers with low precipitation which is highly unreliable. The east coast of Spain, in contrast, has the mild Mediterranean climate, and its influence is more African than European, for it fosters the oasis type of land utilization. In all sections of the dry climate insufficient rain greatly limits economic activity and makes the density of population low. A36

shows that large sections of northeastern Russia have a rainfall of less than 20 inches, but in such high, cool latitudes this does not lead to real aridity.

7. *The Tundra and High Mountains.*—Long cold winters and very short summers with the warmest month averaging below 50° F. make this a region of ever-frozen subsoil. Only during the short summer is vegetation able to grow and only then does a little economic activity in the form of grazing temporarily break the complete unproductivity. The high Scandinavian uplands, partly covered by snow and ice at all times, and the narrow Arctic tundra belt, broken by the White Sea, make up the main tundra sections of Europe, but minor sections are found in the high parts of the Alps and in some other mountain areas, too small to be shown. The relatively small size of both the tundra and the dry types of climate, as well as the absence of tropical types, go far toward explaining Europe's dominance.

The Seasons in Europe. *Winter.*—Although Europe is so large and its relief so complex that the climatic regions described above are very distinct, the march of the seasons is sufficiently uniform so that a general discussion for the whole continent is better than special discussions for each region. In winter as well as in summer the regular subtropical high-pressure area over the Atlantic, the so-called Azores High, is well developed. In winter, however, it is not isolated, as in summer, but forms part of a continuous belt extending completely around the earth, and visible as the "pressure anticline" of A32. A bridge of high pressure extends across northern Africa and southern Europe and connects the Azores High with a much more intense Asiatic High which expands over a vast area from Tibet to the Arctic Ocean. This intense high-pressure area due to extreme cold is balanced on the northwest by an equally extreme low-pressure area, the Icelandic Low. This "pressure syncline," as it is called in A32 owes its origin to the very high temperature, the positive anomaly of 40° or 50° F., which is caused there by the warm Atlantic Drift (A26).

The combined effect of the Azores-Asiatic High and the Icelandic Low, plus the right-handed deflection of the winds due to the earth's rotation, causes a strong inflow of air from the southwest in the part of western Europe from France northward, as appears in the arrows of A32. Farther east, however, even when the winds come from a southerly quarter, as often happens in Germany, Finland, and northwestern Russia, they blow across continental areas which tend to grow very cool during the long winter nights of such high latitudes. This means that in winter northwestern Europe, in spite of its long nights and small amount of insolation, is kept relatively warm by winds from the ocean while the area farther east, dominated more by continental winds, misses this benefit and shows the characteristics of its latitude in the form of low temperature. Consequently, since the source of heat is in the west, we have the unique condition of winter isotherms that run north and south for nearly 2,000 miles and even bend back almost into loops at the far north (A30). The warm oceanic winds also lead to heavy precipitation on the Atlantic border (A36). This decreases rap-

idly eastward, however, and Leningrad in western Russia, for example, has only one tenth as much January precipitation as has Florö in nearly the same latitude on the Atlantic Coast. In the west the precipitation is mainly in the form of rain, and when snow does fall it never stays long on the ground. In the east the precipitation is almost wholly snow, and even a small amount lasts so long that the ground is covered for a considerable period.

These general conditions are greatly modified by cyclonic storms from the Atlantic. In winter these approach the European coasts with great intensity and frequency. Following a course between the centers of high and low pressure, but nearer to the latter, they proceed in a northeasterly direction along the coasts of Ireland, Scotland, and Scandinavia towards the Arctic, or else swing inland in an easterly direction. If they do this, however, the continental high pressure soon blocks their progress, and they die out. This explains the monotony and slight rainfall of the winter climate in the far interior. When the storms move toward the north-northeast along the Scandinavian coast, the mild marine weather is limited to the narrow coastal belt. On the rarer occasions when they proceed inland, the Atlantic air may be carried into the interior, thus breaking the domination of the continental winds. The passing of such a depression means many changes. Mild ocean winds set in; the clear frosty weather comes to an end, the snow cover melts, and rain falls. Because of such conditions one might say that the Central European winter consists of a series of small winters separated by thaws, whereas eastern Russia has a long steady winter with only very rare milder spells.

Farther south along the axis of the high-pressure belt from the Alps to north-eastern Siberia, the winter conditions are generally stable with descending out-flowing air and clear crisp weather. The Swiss mountains owe to this their reputation as a resort for sports and health in winter, for the higher parts bask in the sun even though the valleys and basins are filled with cold fogs. Vienna and Budapest get only half as much rain in winter as in summer. But when cyclonic storms pass nearby, as may happen on either side of the Alps, the wall of high pressure which separates the great Icelandic Low from the minor Mediterranean Low may break down. This causes the well-known foehn winds, like the chinook winds of America. These descend from the mountains, especially on the north side, and cause a sudden rise of temperature.

During the winter the relatively warm Mediterranean Sea gives rise to a low-pressure zone between the continental high-pressure axis and the regular subtropical high of north Africa (A32). As a result, the air flows in general from the colder land toward the warmer sea. Hence clear weather prevails much of the time, and, if a place is protected against the cold land winds, as on the Riviera coast of southern France and northern Italy, the climate in winter is mild and pleasant. But here cyclonic storms are common in winter although rare in summer. Sometimes they come from the Atlantic, breaking through the axis of the high-pressure belt by way of the gap of Carcassonne between the Central Plateau of France and the Pyrenees. Often, however, they are a product of the Mediterranean itself, arising perhaps in the stormy Gulf of Lions. In either case they cause changeable winds, cloudiness, and rain which is especially heavy on the westward side of the mountains (A36).

Spring.—In spring the factors which control the winter climate become weak. The Azores High, to be sure, merely moves northward without losing its strength, but its eastern extension along the continental axis becomes faint, while in Asia the Siberian High is waning, and a summer low is developing in Persia and

Arabia. Moreover, the Icelandic Low loses part of its intensity, and hence the winds are generally less strong than in winter. A rapid increase of insolation diminishes the contrast between land and sea, in both temperature and pressure, and cyclonic storms become less frequent and of less severity. Nevertheless, the equality of temperature between sea and land opens the inland road for some of the storms without diminishing their force, thus causing inland winds of high velocity.

Southern Europe and the interior warm up so much more rapidly than the north and the west coast that the isotherms shift toward their summer position, running from southwest to northeast. Meanwhile in spring southern Europe is getting many thundershowers. The more northern regions, on the contrary, remain relatively cool. This is partly because the snow and frozen ground of winter melt slowly, partly because of the frozen Baltic, and partly because cooling winds blow out from the snow- and ice-covered Scandinavian uplands. Such conditions do not favor much precipitation.

Summer.—In summer a new system of barometric pressure greatly changes the winds and the rainfall (A33). The subtropical Atlantic High now has its center west or northwest of the Iberian Peninsula, while the heating of the great continents causes a pronounced low which covers all central Asia and extends into India, Arabia, and the eastern Sahara of Africa. At the same time the Icelandic Low becomes of minor importance. Because of all this, Europe experiences a monsoon-like flow of air from the Atlantic. This air moves eastward into the continent, but over the Mediterranean changes its direction towards the southeast. The northwest winds thus produced blow regularly towards the Persian-Arabian Low and are called the etesian winds. The cyclonic control of atmospheric circulation loses much of its force because differences in temperature between high and low latitudes are slight. Since insolation is more effective than radiation, the temperature rises. Along the Atlantic border, because of the comparatively slow warming of the water, the western winds have a cooling influence; the maximum temperature does not come till late July or August and a negative anomaly exists, that is, the temperature is a little lower than the average for all places in the same latitude. On the other hand, inland temperatures are much higher than those on the coast, and show a plus anomaly where the marine control dies out. That is why the isotherms in A31 trend from southwest to northeast. Part of the rainfall at this time in western and central Europe is still due to cyclonic storms, but part is due to convection with resulting thundershowers, and part to the relief. Thus, summer is the main rainy season for central Europe and still more in Russia, whereas in western Europe the precipitation is less in summer than in winter. Over the Mediterranean regular northwest winds prevail. As they blow from colder to warmer regions, they do not cause precipitation and the Mediterranean summers are clear, hot, and dry. Only on some coasts, like those of eastern Spain and the Po Basin do onshore winds prevail because of the difference in temperature between land and sea. These bring increased cloudiness and orographic precipitation where they rise over mountains.

Fall.—In the fall the climatic conditions shift again. As the altitude of the midday sun declines, insolation decreases rapidly, the sea is again warmer than the land, and as a result the isotherms shift back to a north and south direction. The Atlantic High moves southward, the Icelandic Low gains in intensity, and cyclonic activity increases rapidly. At the same time the Persian Low disappears and the continental high pressure of winter gradually develops. Atlantic coastal

conditions of high precipitation, high cloudiness, and strong winds contrast with the rather clear, dry weather of the more interior sections. Here the combination of incipient high pressure and of insolation which is still fairly strong causes frequent periods of stable, beautiful weather—a kind of Indian summer. In the Mediterranean the northwesterly etesian winds now bring heavy rain, especially in the northern part, because the lands have now become cool enough to cause precipitation.

CHAPTER III

THE NORTHWESTERN UPLANDS

Relief.—Climate and the relief or form of the earth's surface constitute the background for human activity. Together they largely determine man's mode of life and the kind of crops he can raise. More than this, they greatly influence his philosophy and cultural outlook. When climate and relief are compared, the climatic influence is undoubtedly the stronger, but the two are so intimately interwoven that it is often difficult to say which is the deciding factor. The geological origin of this complexity is described in the note at the end of this chapter.

The relief of Europe shows great complexity. Except on the lowland plain of Poland and Russia, one can scarcely drive a hundred miles without observing rapid changes in scenery and corresponding changes in the life of the inhabitants. The changes may be due to the contrast between life on plains and in mountains, or on coasts and inland, but even within the limits of any one major type of relief there is often high variability—a quality which is one of the characteristic features of Europe.

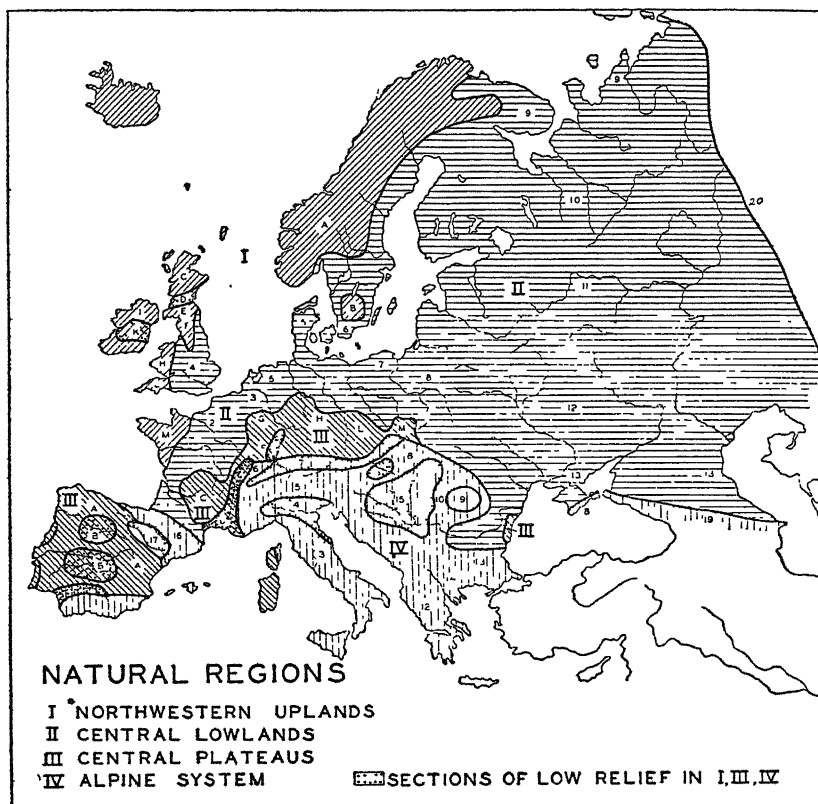
Because of this variability the geography of Europe is the geography of many small units, or natural regions, of which there are so many that it is impossible to show them all on a general map. Hence in A42 an attempt has been made to bring some simplification into this physiographic chaos. Four major divisions are recognized, each composed of numerous small units, but nevertheless uniform enough so that there are good grounds for calling it a distinct type. These four divisions are as follows:

I. The Northwestern Uplands, extending along Europe's northwestern border from western France, Great Britain, and Ireland to Scandinavia and Finland. With these higher regions, for practical reasons and also because of geological structure, may be placed the lowlands of Ireland and Scotland.

II. The Central Lowlands, stretching from the basin of the Garonne at the foot of the Pyrenees through the Paris basin to Belgium, Holland, and onward. Southern England, although separated from

the rest by water, is part of the same lowland. Eastward the plain includes Denmark and northern Germany and then expands in Poland, the Baltic States, and Russia, so that it occupies all of eastern Europe from the Baltic and the White seas to the Black Sea and the Caspian.

III. The *Central Plateaus*, including the Spanish Meseta, the



A—Natural Regions of Europe.

Central Plateau of France, the many uplands of central Germany, and the Bohemian basin.

IV. The *Alpine System*, a complex combination of young mountains and their forelands with intermontane basins and plains. This division includes not only the Alps, but also the Pyrenees and Sierra Nevada in Spain, the Carpathians and Balkans with the enclosed plains of Hungary and Yugoslavia, the Balkan Peninsula, and the mountains of Crimea and the Caucasus.

Relation of Physiographic and Climatic Provinces.—Some of the physiographic divisions correspond fairly well with the climatic divisions of the preceding chapter. Thus the *Northwestern Highland* shows a strong concordance with the climatic region of western Europe. It extends farther east in Scandinavia so that it includes the Alpine climate of the Scandinavian Highland, but this section is of little importance from the human standpoint. On the other hand, the Northwestern Uplands do not extend so far east as does the West European type of climate in the regions around the North Sea. England and northern France, together with Belgium, Holland, and western Denmark belong to the Central Lowlands although they have the West European climate. Hence for descriptive purposes the Northwestern Uplands form a much better unit than the West European climatic region. A strongly marine character gives considerable climatic unity even to regions as widely separated as Brittany and northwestern Norway.

The *Central Lowlands* display far less climatic unity than the Northwestern Uplands. They extend from the West European type of climate in England across the Central European type. Then they expand to cover the whole of the East European climatic region as well as the dry region of southeastern Russia and the tundra region of the north. Nevertheless, the unity arising from the widespread gentle relief and the gradual nature of the transitions from one climatic type to another make it easier to give a good general description on a physiographic than on a climatic basis.

The main portion of the third physiographic division, the *Central Plateaus*, extends from southern France to Poland and lies mainly south of the Central European Lowlands. The contrast in landscape and in human activities between the plateaus and the lowland to the north makes it advisable to present the main description of this region in terms of physiographic regions rather than of climatic types. The other main part of the Central Plateaus—that is, the Iberian Meseta, is characterized by three types of climate among which the dry type is predominant. It has a physiographic unity which justifies a general description in spite of the climatic diversity.

The fourth physiographic division, the *Alpine System*, combines the Mediterranean and Southern Transition types of climate with the Central European type. Here the Mediterranean type of climate gives a very pronounced character to certain regions, but in its more typical forms the real Mediterranean influence is largely coast-wise, while the numerous mountains back from the coast have a climate much more like that of central Europe. Hence, here too, in

order to picture the country as a whole, it is well to use the physiographic divisions.

In conclusion, then, it may be said that the four great physiographic zones give the least confusing picture of a very complex continent, and in describing the picture there will be ample opportunity to bring out the climatic element.

Division I. The Northwestern Uplands.—Facing the Atlantic and washed by the warm waters of the Gulf Stream, the uplands of Brittany, Wales, Ireland, Scotland, and Scandinavia show all the characteristics of a marine location. The western winds, loaded with moisture and forced to rise over the uplands, cause heavy precipitation, and the wind-swept, rain-drenched surface is often swampy and not suitable for intensive utilization. As a result the density of population is low, except in a few especially favorable spots. Limited possibilities and mountain isolation have here caused small groups of strong people to preserve ancient traits and customs. The Bretons in western Brittany still talk a Celtic dialect; the Welsh and Scotch mountaineers are proud of their Gaelic speech and defend their ancient folklore. The Irish, who are like the Welsh and west Scotch in being racially of Mediterranean origin, are an especially good example. They owe their present political freedom partly to their adherence to a Celtic background, while the Irish language, long limited to the isolated mountains in the west, has had a mild literary revival.

The Coasts.—In most parts of the Northwestern Uplands the sea plays a major rôle, for it offers greater attractions than does the often inhospitable land. Hence a description of coastal conditions will precede that of the land itself. Most of the coast is extremely irregular because of an invasion of the land by the sea after the Ice Age. The invasion was due partly to an actual rise of sealevel through the addition of water set free by the melting of the icesheet, and partly to a sinking of the land under the weight of the ice and subsequent failure to rise again to the old level. Thus the sea has transformed the lower portions of the land into bays and gulfs, leaving the higher parts as islands and peninsulas.

It is hard to find a more beautiful type of coast. In Brittany and Cornwall rocky promontories shelter peaceful bays from which green meadows lead gently to the upland surface; in Scotland narrow lochs extend far inland bordered by the bare rounded slopes of the highlands. But in the Norwegian fiords nature reaches its peak of beauty. Former valleys, once deepened by glaciers and now invaded by the sea, reach far inland. Protected from the stormy ocean by rows of rocky islands, the calm waters of the fiords are often enclosed by

almost perpendicular walls of rock, the bareness of which is broken by little patches of grass and flowers wherever the slope is less steep, and by roaring waterfalls where streams plunge down from the ice-covered *fjeld*, or plateau high above. Coastal steamers glide for hours through these mountain streets, stopping frequently where a little space is left between the water and the mountain wall, and a few houses surrounded by vegetable gardens show the struggle of man to exist.

On these coasts it is not the land but the sea which supplies the economic basis of life. Here is one of the world's greatest fishing regions. The warm Gulf Stream, keeping the coastal water free from ice even beyond the Arctic Circle, and the large amount of food, brought by the continental rivers, especially in the English Channel and the North Sea, provide excellent living conditions for fish. Fishing fleets pursue the cod in the coastal waters even to the Lofoten Islands and Finmarken in far northern Norway where temporary fishing settlements disturb the silence of the long, dark winter nights. Herring are caught near the Shetland and Farøe islands in winter and in the southern part of the North Sea in summer, while the sardine is seined in the coastal waters of France and Portugal. The fishermen often sail long distances. From the quaint Breton fishing towns, for example, where lace-capped women sit embroidering in front of their homes, the fishing boats sail to the Mediterranean for tuna and to New Foundland and Iceland for cod.

Fishing dominates life; it means the money to pay for all sorts of necessities. It also means the everlasting danger of storms when the family waits in vain for the return of the husband and father. In Scotland the fishing population is especially concentrated along the sheltered northeast coast from which express trains bring the catch to the city markets for the English breakfast table. But it is in Norway that the sea's control of human life reaches its greatest development. The relative abundance of the fish, and the varying oily content of their livers, mean comfort or poverty to the coastal settlements. Constant contact with the sea, while the land only with great difficulty provides a supplementary income, has made the Norwegians the best sailors of the world from the ancient time of the Vikings until now. These Norsemen colonized Iceland, knew Greenland and the Acadian Coast of Nova Scotia; they extended their trips southwards along the western coast of Europe into the Mediterranean, often leaving smoking ruins in their path. The modern Norwegian inherits the love of the sea. Norwegian freighters can be found in the world's most isolated harbors looking for cargo.

Only along the Irish coasts and in west Scotland is fishing of less importance. This may be because the open Atlantic with its fogs and gales offers too great a handicap, or because the barren land does not provide the timber so necessary in building boats. Nevertheless, in the Northwestern Uplands as a whole, a productive sea opposes an inhospitable land, and a narrow fringe of denser coastal population surrounds the deserted uplands.

The Land.—Latitude and elevation combine to make the high plateau of Scandinavia practically worthless. It is merely a starting point for the many rivers which, when they tumble down the slopes, can be used for the power/so important in these countries without coal. {The broad Norwegian *fjeld* (1-A in A42), an old surface of erosion, now far uplifted and cut to pieces along its flanks by rivers, is for the greater part covered with ice/ Its high summits appear only as insignificant hills on the rolling white surface. From the fiords on clear days the tourists can see the glistening icy tongues of glaciers hanging over the border of the *fjeld*. Even when lower elevation causes ice to be absent, the flat, stone-covered surface, snowy most of the year, offers very scanty food for the cattle and goats of the peasant who brings his stock along steep trails up to the plateau in search of pasture.

/The drop from the plateau towards the west coast is abrupt. Dark, treeless, barren slopes face strong westerly winds which cause clouds to hang low over the mountains, while the beauty of the fiords is hidden under a falling rain/ In contrast,/the eastern slopes are more gradual, and their leeward location shows itself in less precipitation, more sun, and more extreme temperatures in summer and winter. Here the forest of conifers is dominant/—from Oslo along the Swedish uplands to beyond the Arctic Circle. Locally some summits rise above the forest zone and are covered with grass and colorful flowers, but the general impression is of a dark green mantle of trees, interrupted here and there by the glistening of innumerable lakes and by the courses of rivers which follow the general incline towards the Baltic.

/In these forests on the eastern slope of the Scandinavian Highland man is practically absent except when occupied in mining or the exploitation of lumber/ Felled in winter and transported by truck to the neighboring river, millions of trees float down the river courses after the ice melts in spring. They are finally caught at the river outlet where numerous paper mills and pulp factories are located/ Only in some depressions, offshoots of the Baltic coastal plain, do fertile soils and the long summer days combine to make it possible

to raise crops of barley, oats, and hay. In the far north the reindeer-herding Lapps, invaders from Asia, represent almost the last European remnant of nomadic life, a true adjustment to an unfavorable environment.

Disconnected from the other uplands by the central Swedish lowlands, the Småland Plateau (I-B in A42) in southern Sweden is similar to the region just discussed except that the light green of beech and aspen breaks the monotony of the dark green conifers and reflects the influence of a more southern latitude.

Taken as a whole, the Scandinavian uplands present a picture of mountain and forest isolation while human settlements are limited to the coastal waters and fiords or to certain favorable valleys. The few railroads follow the lines of lowest relief except for the connection between Oslo and Bergen, where the railroad, with great expense, had to be carried over the *fjeld* to reach the west coast.

The uplands of the British Isles and western France do not differ greatly from those of Scandinavia except that the elevation and latitude decrease toward the south, thus causing less extreme conditions. The Scottish highlands (I-C) are undoubtedly attractive on a clear day when the summits, sculptured by the glaciers of the Ice Age, show the purple color of blossoming heather, and many lakes break the monotony of this stern but rather uniform landscape. Nevertheless when clouds lay a dense fog over the hills and rain falls for days and days, as frequently happens, the life of the Scottish highlander caring for his flock of sheep approaches the limit of human endurance, and it needs the ardor of the English deerstalker to wade through the spongy moor without complete disgust. But the broad valleys opening towards the drier east offer better living conditions; woodlands give color to the landscape, hedge-bordered meadows and cultivated fields occupy the fertile valley bottoms, farmhouses reflect the general prosperity; and ancient castles add to the attractiveness of the environment. Here graze the cattle, here fatten the sheep, here the roads and railroads penetrate into the core of the upland.

How different are the Central Scottish Lowlands (I-D) which occupy the great rift between the Scottish Highlands and the Southern Uplands! Long belts of low hills, owing their existence to the outcrop of hard rocks, border fertile stretches of level land. A mild climate with heavy precipitation favors grassland which prevails in the west, while in the drier east fields of wheat and oats and many orchards, together with grassy meadows, give an impression of agricultural abundance surprising for so northern a latitude—a product of favorable conditions of climate and soil but also of the energy of the in-

habitants. Great banks of smoke hanging over the Clyde River show that another factor here enters into human activity. Based on layers of coal and iron ore, large industries have developed, and the dirty factory cities in the west contrast strongly with the beautiful urban seats of learning and culture in the east.

The Southern Scottish Uplands (I-E) lack the severity of the Northern Highlands, the mountains are less high and the relief is more gentle. Great herds of sheep wander over the rolling hills on which the heath still reigns, and cattle graze on the lower grasslands. Along the wide fertile valleys with their park-like vegetation, intensive agriculture penetrates far inland and the great north to south railroad lines connecting England with the Scottish Lowlands run through them bringing modern life into once isolated vales.

To the south, the Pennine Chain (I-F) is no more than a great fold separating two of the greatest industrial developments of the world. Coal layers outcropping at the base of the fold have greatly stimulated this development. Industrial plants have invaded the Pennine valleys in search of water. Trains roar through the mountain gaps connecting Lancashire on the west with Yorkshire on the east, but the uplands are still covered with moors, a haven of peace surrounded by the buzzing of modern manufacturing.

Cumberland and Wales (I-H) remind us once more of Scotland. The lakes of Cumberland, the land of the lake poets, are like beautiful jewels in their steep mountain frame, but most of the valleys are narrow and stony while the moor-covered slopes are soaked by the many rains. From Snowdon, the highest point of Wales, the view is very similar to that from Ben Nevis in Scotland—an endless sea of summits, the highest gray, rocky, and glacially sculptured, with little lakes at the bottoms of cirques once occupied by glaciers, but the greater part brown in color because of moorland vegetation. Here, too, the people live on the borders of the highland; there lie the towns and villages, the cropped fields, and the orchards. Summer resorts abound along the coast of Wales, while in the south near the Bristol Channel mining, with its noise of railroads, trolleys, and engines, has invaded the narrow valleys in search of coal. The main mass of the upland, however, is left in the majestic silence of mountain beauty; the shepherd with his flock is the only human element.

In the highlands of Ireland (I-I) the traditional green, a product of a marine climate, is broken by the somberness of the bog-covered uplands. Steep peaks of quartzite and granite rise abruptly from the marshy upland level devoid of any sign of human life. Enormous volcanic eruptions, such as those of the famous Scotch island of

Staffa, have formed an extensive lava plateau in the northwest, in which Lake Neagh forms a structural depression. Massifs of red sandstone enclose deserted basins, the bottoms of which are occupied by glistening lakes. But also there is many a charming valley where a tree-bordered river winds its way between green meadows and yellow fields of grain. This is especially true in the east where abundant fields are a token of climatic clemency wherever the relief and soil permit.

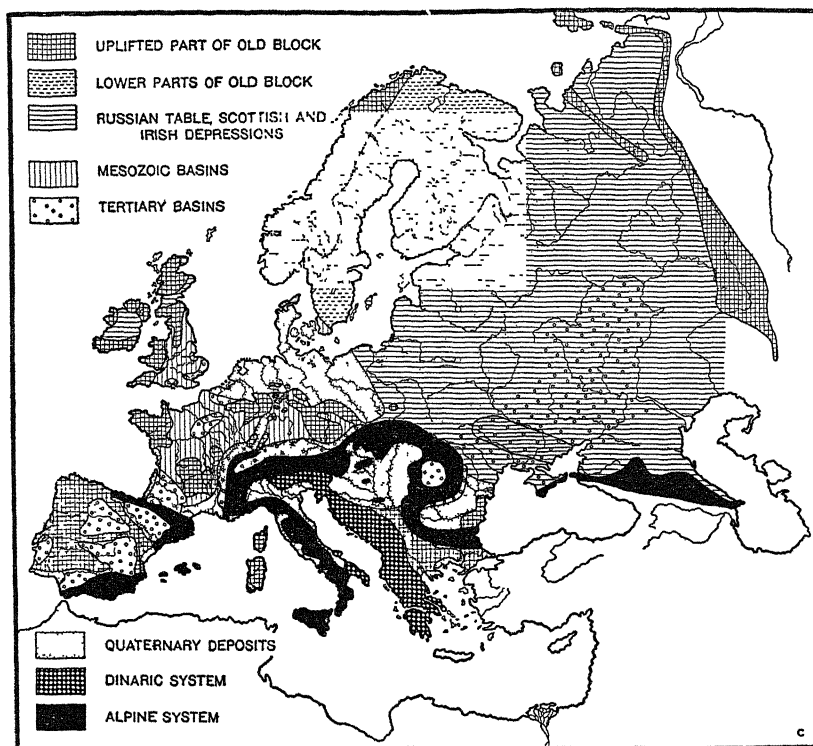
In the center of Ireland a great lowland (I-K) is completely surrounded by the uplands except on the east. The underlying rock is limestone so that karst topography with frequent undrained hollows prevails. Peat extends over the more humid western parts of this central lowland. Stagnant pools cover large areas, and slow-flowing rivers drain towards the Atlantic. Peat here assumes great importance, and the acrid smoke of burned turf hangs over the rural cottages which are picturesque rather than hygienic. In the east where the rainfall diminishes and glacial deposits cover most of the limestone, grass and woodland replace the peat and make this section the economic heart of the Irish Republic. Here graze the cattle for which Ireland is famous. Here are found the fields of oats, barley, wheat, and potatoes. Nevertheless, here, only a little less than in the west, the marine influence dominates, giving Ireland its year-round verdure—green Erin, the Emerald Isle.

(Cornwall (I-L) in southwestern England and Brittany and Normandy (I-M) in western France, although separated by the wide English Channel, are very similar. Both are uplands of minor elevation in which the wind-swept open land is covered with moors, fit for little except sheep. On more sheltered spots woodland is found, and the farmer raises crops of rye and buckwheat, or grazes his cattle. But the soil is infertile, the yields are low, and the farmer's life is still primitive and backward. The monotony of these deserted uplands is broken by basins in which fertile alluvial soils and milder climate combine to increase productivity. Here cattle are fattened and famous cheeses are made; here fields of wheat and oats replace rye and buckwheat, and apple trees are so common that cider is the national drink. The basins, however, are rather small; and open, rolling uplands, with only a limited use on the part of man, are dominant.

This ends the picture of the Northwestern Uplands, an area full of charm and beauty, but also one where man leads a life of struggle against many unfavorable elements, and where the sea plays a large part as a source of production.

NOTE TO CHAPTER III

*The origin of Europe's Four Physiographic Regions (A50).** From the geological point of view, all the continents may be thought of as the result of the interplay of two old blocks, southern and northern. According to the theory which now seems most probable, these blocks are masses of gneiss and granite which have persisted throughout geological times because of their rigidity, and have therefore become the nuclei of the present continents. The northern block is represented in Europe by some of the old rocks of Scotland and Scandinavia;



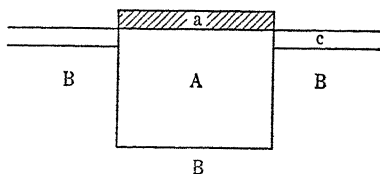
A—Structural Map of Europe.

it probably lies buried below the later deposits of the Russian lowlands, but its greatest extension is found in the Laurentian uplands of North America and the Siberian Plateau of Asia. The other block forms the core of the continents of the southern hemisphere. It is now broken into several sections between which lie the Indian and South Atlantic oceans. Throughout much of geological his-

*This section, as well as others in small type, are especially intended for more advanced students and may be omitted without injury to the general plan of the book.

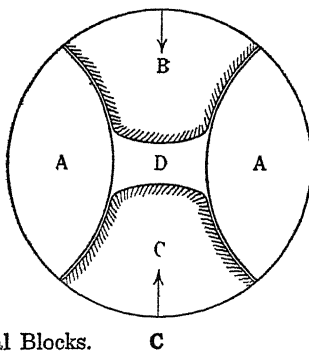
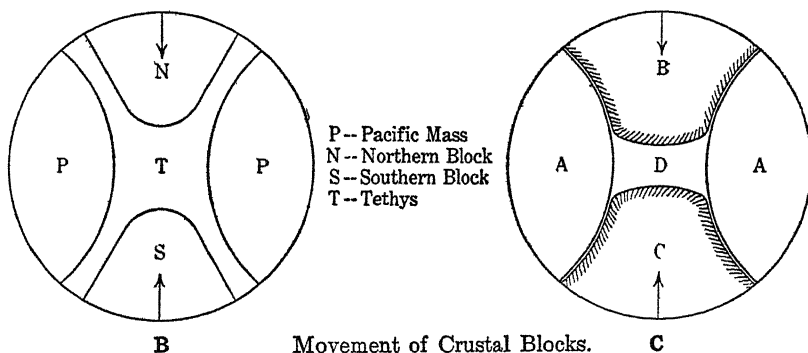
tory the two main blocks—northern and southern—have been separated by a central depression, the so-called Tethys Sea, which in past ages more or less girdled the earth in semi-equatorial regions.

According to the ideas of many geologists, these blocks consist of material a little lighter than the main mass of the earth's outer layers. Therefore they float on the upper layers of the earth's crust and if subjected to constant and sufficient pressure can be moved in any direction. A51 shows an ideal cross-section of such a block. The rigid block *A* is in equilibrium in respect to the upper layers of the earth's crust (*B*), which are less rigid but heavier. In other words, it acts much like a piece of ice in water. The emergent part of *A* (labeled *a*) represents the continent, while the ocean (*c*) covers *B* completely. If *A* moves, the movement takes place only very slowly and in the face of great resistance. The result is that folding, involving both *A* and *B*, takes place in front of the moving block. The folding shows itself at the earth's surface in the form of mountain ranges. According to the Swiss geologist, Staub, who may be considered the main exponent of this hypothesis of earth structure, a third block of extreme rigidity is completely submerged under the Pacific Ocean.



A Light Block of the Earth's Crust.

The present structure of the continents is supposed to be the result of movements of the northern and southern block in the gap between the two sides of the vast Pacific mass, as shown in B51.



Movement of Crustal Blocks.

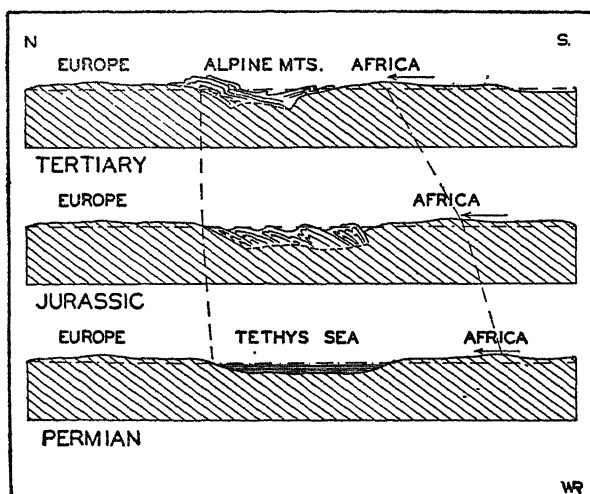
Throughout the geological history of the world, blocks *N* and *S* have shown a tendency to move equatorwards, probably as a result of the earth's rotation. During such movements mountain ranges are thrust up not only on the equatorial sides of the northern and southern blocks, thus narrowing or temporarily eliminating the Tethys Sea, but also along the edges of the Pacific block (*A* in C51).

In this way the world's mountains show a double aspect: a circum-Pacific system including the Sierra, Rocky, and Andes mountains, as well as the ranges

in the islands and coastlands east of the Pacific, and an equatorial system which is considerably displaced toward the north and includes the Alps, Himalayas, and Caribbean mountains of the West Indies.

Periods when the blocks advanced so that mountains were upheaved have been followed by periods of rest. During the latter there has even been a tendency for blocks *N* and *S* to slide backwards, as if in their previous movement they had gone beyond the limits of equilibrium and had to fall back. It is impossible here to go into details of this process, or to mention its many complications, but the theory paves the way for a general understanding of Europe's relief.

The fourth or Alpine division of Europe, as shown in A42 represents the zone of contact between the northern and southern blocks during the last, or Alpine, period of movement. The way in which the mountains were formed is illustrated in A52. There the lower diagram shows the condition in ancient Permian times

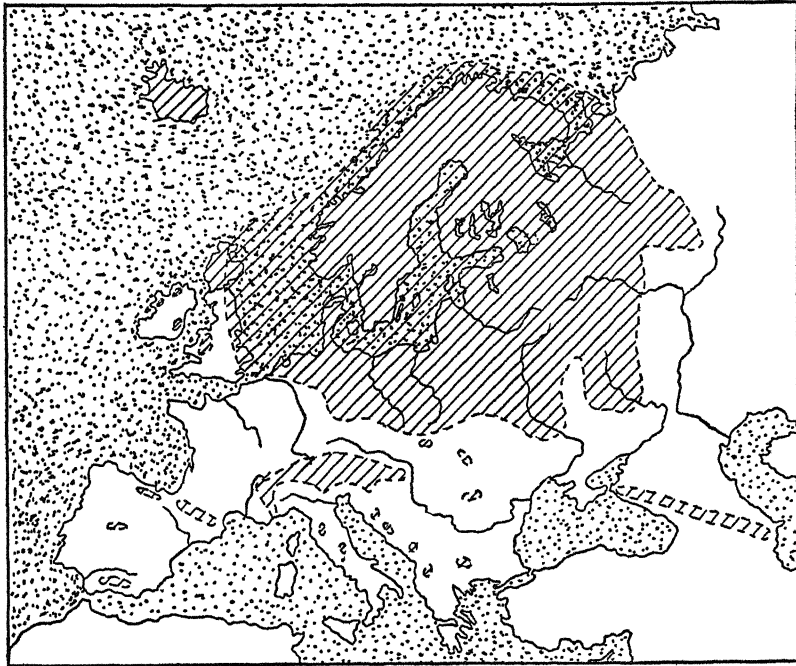


A—Cross Section Showing Origin of Alps.

when the African part of the southern block was separated from the European part of the northern block by the Tethys Sea. In this sea thick sediments derived from both blocks were laid down. Later on, during the Jurassic period, the movement of Africa northwards diminished the width of the Tethys and caused the sedimentary layers to be folded in such a way that the upper parts of the folds, the anticlines, appeared as rows of islands in the Tethys Sea (A52). Finally, in the Tertiary period, the old African and European blocks approached one another so closely that the Alpine mountain system was formed (A42). This consists mainly of Tethys material shoved up over the two blocks, and leaving only small remnants of the former Tethys. Thus the young Alpine mountains with their complex structure seem to be folded parts of both blocks as well as of the floor beneath the Tethys Sea. The Alps in the more limited sense, as shown on the map of structure (A42), contain mainly northern material, while the Dinaric System in Yugoslavia represents the southern block. The Mediterranean is all that is now left of the Tethys. It was formed after the cessation of the last great

movement and is the result of the recession of the southern block, which had gone far beyond the limits of equilibrium and therefore slid backwards.

The Northwestern Uplands and the Central Plateaus of Europe, divisions I and III (pages 41-2) are remnants of pre-Alpine periods of mountain building. They stood on the border of the Tethys, and were once high mountains like the Alps. During a long period when mountain-building had come to an end they were attacked by erosion and leveled to the gently rolling condition known as a peneplain. The great stress of the ensuing Alpine period, however, exerted such pressure on the northern block that these old mountains, the most vulnerable parts of the block, were uplifted again as plateaus. Nevertheless, geologically



A—Glaciation in Europe. Diagonal shading indicates extent of icesheets.

they are old, and in many cases still show the peneplain, now uplifted and again under the influence of erosion. During the Alpine uplift, the Central Lowlands (division II), which form a depression between the Northwestern Uplands and the Central Plateaus, remained low, and are now partly submerged to form the North and Baltic seas. Elsewhere also this great central lowland was once a shallow sea. In the west its sedimentary layers are slightly uplifted so that in England and France escarpments have been developed representing the outcrop of more resistant layers or rock, while in the east young glacial deposits bury the broken substrata entirely (A53). Around the Baltic Sea in Sweden and Finland the glacial cover is so thin that the rocks of the ancient block come to the surface.

CHAPTER IV

CENTRAL LOWLANDS AND UPLANDS

The Central Lowlands (II in A42). Comparative levelness is the dominant feature of the Central European Lowlands. These extend funnel-shaped from the Pyrenees towards the northeast through France, Germany, Poland, and Russia until finally the Urals separate them from their Siberian continuation. In the lowlands the rough topography and high elevation which limit human occupancy of the highlands are eliminated, and differences in relief have little effect on human activity. One result of the levelness is ease of transportation. Broad, slow-moving rivers provide in most cases an excellent means of transportation. Interconnected by many canals they form the base for a system of waterways unequaled in the world, and supplementing a dense railroad net which is undisturbed by obstructions due to relief. Another effect of the levelness, wherever the climate is favorable, is the density of population. Here dwell most of Europe's inhabitants. Here, or along the edges of the lowland, are found the great centers of manufacturing. Here are the great harbors. Here, too, are the great European nations—all except Italy—which control the major part of the world.

In spite of the levelness, it would be wrong to suppose that these lowlands are uniform and monotonous. In the north the ancient icesheet left the rocks bare, although elsewhere a universal mantle of loose soil makes it easy to use the soil for agriculture. In small but very important sections the presence of coal, iron, and other minerals has greatly altered the scenery by stimulating industry. Nevertheless, on the whole, the climate with its effect on native vegetation, agriculture, architecture, and transportation, is the chief cause of the difference between one section of the lowland and another. Only in the east does uniformity prevail. A regional description starting in the southwest and following the general trend towards the east will bring out the different geographical aspects.

1) *The Aquitaine Basin* (II-1 in A42).—Between the limestone uplands of the Central Plateau and the huge and much-dissected cones of *débris* which border the northern slopes of the Pyrenees lies the Garonne Basin, forming the center of the Basin of Aquitaine. From

a narrow but low gap opening easily towards the Mediterranean coastal plain it widens northwestwards and includes the coastal lowlands from the Pyrenees to the Vendée Uplands south of Nantes. In the higher portions one drives for miles on a flat plain only to descend at intervals down a steep but cultivated hillside into a valley. Elsewhere the land is flat except that the rivers flow in terraced valleys. Hedges or houses rarely break the broad green expanses between village and village, but there are plenty of trees, while in the south the snowy peaks of the Pyrenees can be seen in the distance. The general impression is one of agricultural variety and abundance. Cattle fatten on the grass-covered river floodplains, and waddling lines of geese recall the fame of the goose liver (*pâté de foie gras*).

Open to the rain-bearing winds of the Bay of Biscay, heated by the summer sun of middle latitudes, and warmed in winter by winds from the ocean, the fertile alluvial soils are highly fruitful. On the higher terraces market gardening prevails—artichokes, asparagus, tomatoes, cucumbers—which together with the plum and walnut trees reflect the relatively warm climate. Fields of wheat and corn ripen in the sun, but the most typical crop of the Garonne Basin is the vine. Grapes grow everywhere, and dominate the landscape entirely in many places. Little villages and medieval castles bear names that are carried all over the world on the labels of bottles of dark red Bordeaux wines or of gold-colored brandy. Here the wine reaches its highest perfection, a product of sun-kissed fertile soils.

While the east and south of the Aquitaine Basin present in general a rolling aspect, the western part along the Bay of Biscay is very flat. This is the broad zone called *Les Landes*. On its western edge sand dunes border a straight coastline at the inner base of which shallow lagoons with no outlet to the sea form an almost continuous chain of lakes. The region inland from the lagoons was once an almost unproductive marsh where people used stilts as a means of traversing the swampy surface. In late years, however, the whole region has been drained and planted with the maritime pine. As a result malarial mosquitoes have disappeared, conditions of health have greatly improved, and the resin from the pines provides the naval stores of France.

② *The Paris Basin* (II-2 in A42).—North of the *Landes* the gap of Poitiers between the Central Plateau of France and the Vendée offshoot of the uplands in Brittany connects the Garonne Basin with that of Paris. Geologically the Paris Basin is a beautiful example of concentric escarpments with their steep sides outward, that is, away from Paris. The escarpments are due to outcrops of rela-

tively hard layers which dip towards the interior where Paris is the geographical as well as geological center. On the eastern side of the basin the escarpments facing the Vosges stand out most clearly. Their individual names were made immortal during the World War when they formed obstacles in the German march towards Paris. The upper Loire and Seine rivers (A352), with their main tributaries, follow the slope of the rocks toward the center of the basin but, instead of combining, break their way separately through the western rim towards the Atlantic. On the other hand, the eastern rivers, for example the Meuse and Moselle, follow the escarpments and flow around the basin instead of inwards.

Although differences in relief and soil give individuality to the various regions of the Paris Basin, they do not prevent a certain uniformity. In most parts the dominating impression is that of a gently rolling plain—in summer a waving sea of grain in which red poppies and blue corn flowers stand out amid the yellow straw, in winter a gray mass of sticky mud. The chimney of a sugar factory located among fields of sugar beets, villages rebuilt with red brick in the north after the devastating World War, or made of stone as gray as the winter landscape in the south—these are the chief things that one sees in many places for mile after mile in winter. The gentle valleys of the rivers break the monotony of such a scene, and give charm to rural France in summer. A wide, level valley with rather steep wooded slopes, terraced for grapes where it faces the south; a slow-flowing shallow river bordered by poplars and often paralleled by a canal on which a boat moves slowly pulled by a horse on a tow path; a fertile, alluvial valley bottom intensively cultivated with garden crops; little gray farmhouses overgrown with vines and surrounded by fruit trees; picturesque old stone chateaux, or country houses, standing in parks of magnificent old trees; walled cities of a medieval appearance standing out above the plain and protected at prominent points by medieval castles representing the outwardly glorious but inwardly wretched period of the French kings and bearing names that recall the dukes and counts of the Middle Ages—all these represent France in its most typical form. This is not the France of Paris with the luxuries and noisy life of a great capital, but the France of the industrious farmers and other thrifty villagers who are still their country's backbone. Only in the east do the escarpments of the Paris Basin present really prominent features of relief. There they stand out boldly as steep forested walls flanking the broad cultivated river valleys.

The Lowland of Brabant (II-3 in A42).—Farther north the low

plateau of Brabant in central Belgium resembles the Paris Basin. Only in the south, however, do a few traces of the escarpment type of scenery appear, and the general appearance is open and cheerful. Fertile loess, as in France, makes rich crops possible. Instead of being all crowded together in compact villages as in France, however, the small homes of the Belgian farmers, who often work in a nearby town, are surrounded by fruit and vegetable gardens which break up the great fields of grain most pleasantly. Towns are numerous—some being compact with the belfries of the churches rising above a sea of steep-gabled houses, but others spreading through suburbs out over the surrounding hills. Here Latin and Germanic culture meet on the great road from France to Germany, where all through history battles have been fought to decide political supremacy. Here, too, is the world's region of highest agricultural yield, a result not only of soil and climate, but of the character of the farmers.

(U) *The Lowlands of England* (II-4).—The lowland of France and Belgium reappears in England. The shallow English Channel and North Sea are merely drowned portions of it. Beyond them in England the lowlands, which extend as far as the Pennine chain and the uplands of Wales and Cornwall, are in many ways similar to the Paris Basin, showing the same geological structure. But how different the aspect! The long escarpments of limestone and chalk with their treeless, rolling surface, and their vegetation of heather, good only for sheep, approach the English uplands in appearance. Along the southern coast they break off in high, steep, white cliffs, almost dazzling in the sunshine. Across the narrow Strait of Dover these cliffs face the similar "Falaise" of northern France. But the broad open vales between the escarpments and back from the coast give the real picture of rural England. There grassland dominates the scene, especially in the more humid west, although fields of grain are abundant in the drier east. One of the most characteristic features is that the meadows and cropped fields are almost everywhere enclosed by hedges. Tree-bordered lanes lead to villages where cottages with roofs of tile or even straw often stand in gardens full of colorful sweet peas. Trees abound everywhere. They may form little spots of woodland, remnants of the former widespread forest, or they may stand as individual trees, giving the typical park-like vistas amid which great castles raise their ancient towers. Here also one finds huge industrial developments connected with the underlying coal layers. These give rise to ugly smoke-colored cities where even the suburbs consist of long and monotonous rows of two-story brick houses with only the tiniest gardens. These, however, are only minor features in the landscape.

Nothing is more pleasant than to drive leisurely through these English lowlands visiting not only the villages with their beautiful gardens, but also the superb cathedrals in their setting of ancient trees, and stopping at some quaint inn beside a tree-bordered river which winds its way between green meadows. This is rural England.

5, *The Low Country Type* (II-5).—Back on the continental side of the North Sea the lowlands northeast of the Brabant Plateau show a distinct zonal arrangement somewhat like that of the Landes several hundred miles to the south. Along the coast, especially in Holland, lies a band of sand dunes. Behind this, and corresponding to the lagoon lakes of the Bay of Biscay, is a low district occupied partly by “polders” or old lake beds reclaimed by building dikes and pumping out the water, partly by drained swamps which also lie a little below the level of high tide, and partly by waters like the Zuider Zee, now called Lake Ysel, and the channel inside the Frisian Islands where the sea has broken through the dunes. Still farther inland a third zone takes the form of a sandy plain. In an attenuated form all three of these extend clear to the north coast of Denmark.

The richest and most populous part of this region is a narrow belt of rather sandy soil between the inner margin of the sand dunes and the main polders. Here in Holland one finds dignified cities with suburbs full of flowery charm; stately country homes, which in their beautiful parks reflect the wealth brought from a colonial empire; and prosperous villages surrounded by vegetables and fruit, while in huge greenhouses tomatoes and grapes ripen in an artificial climate. All this shows the quiet cultural life of a contented nation. The great moment is here in early spring when immense fields of brilliant tulips, hyacinths, and narcissus attract innumerable visitors, both Dutch and foreign.

Color is also the main theme in the adjacent “polderland,” once a coastal lagoon or marsh, but now reclaimed. Nowhere are the colors more impressive. Green meadows, in which graze many cattle—brown, or black and white; numerous canals and lakes reflecting the everlasting interplay of the clouds; large red-roofed farmhouses hidden amid dark green foliage; and finally villages and towns with bright red brick houses, carefully scrubbed. All this is Holland as the great Dutch painters have immortalized it.

Not everywhere has man been the winner. In many places the sea, breaking through the dunes, still occupies large parts of the polder zone. Especially in northwestern Germany, as far as the Jutland Peninsula of Denmark, the reclaimed polderland is separated from the

dunes by broad mudflats in which the river estuaries form deep channels suitable for ocean transportation.

The inner zone of the North Sea lowlands, bordering the polders on one side and the uplands on the other, is generally a flat sandy plain broken only by local sandy hills. /From Flanders this type of land extends through southern and eastern Holland into Germany where it widens considerably and sends out broad lowland bays into the southern upland/. The sand of the plain was mainly deposited by streams from the great icesheet, but rivers from the south German highlands also contributed their part. The hills, on the other hand, are mainly glacial, being either moraines or places where the ice pushed up masses of earth and rock. Once a great forest of pine, oak, and beech covered this sandy stronghold of the old Germanic tribes, but these people learned gradually to cultivate the light soils and clear the forest. Even now agricultural value is often low, and meager crops of rye, buckwheat, and potatoes scarcely provide a living for the inhabitants of the straw-thatched farmhouses. Large sections remain waste land, and in the summer the warm air rises trembling above a carpet of purple heath against a background of dark green pines.

| In some places, especially in Holland, new life has come into this sandy zone through the improvement of agricultural methods and the increasing demand for food in western Europe/. When fertilizers are added, the sand becomes productive and the yield of crops increases rapidly. Canals have been made to lower the waterlevel and transport the peat, which in many places covers the sand. Factories have been built using this cheaper but firmer land, and industrial regions have developed where once sheep grazed and bees sucked the honey from the heather. This formerly waste land has also attracted many people for recreation and for summer homes. Bicycle paths cross the rolling heath, and attractive cottages, standing amid a wealth of flowers, show the great desirability of having free, open land in a country where in most sections all the land is used for production. Beyond the Elbe in Schleswig, and especially/along the west side of the Jutland Peninsula in Denmark, a narrow strip of this same sandy plain has been the scene of a recent colonization/which is curiously suggestive of the settlement of new lands in western America. Here, as in Frisia, land that seemed perfectly worthless—fit only for heather—has been made to support a profitable dairy industry.

Along the inner borders of the sand-plain near the upland another definite change takes place. /Coal layers near the surface have become the base for the continent's greatest industrial development/

An almost continuous zone of factories and industrial towns extends from northern France through Belgium far into Germany. At night blast furnaces throw fantastic colors over the land where cinder piles look like volcanic cones rising out of the plains.

6/ *The Ground Moraines of Southern Scandinavia* (II-6 in A42).—

Beyond the Elbe four main types of lowland landscape can be recognized. Beginning in the north they are ground moraines, terminal moraines, alluvial river valleys, and the southern zone of loess. The ground moraine landscape is characteristic of the Baltic shores, but is also found inland between the terminal moraines. The Danish islands east of the sandy peninsula are a typical example. The relief is gentle and rolling. Many lakes fill small hollows, while similar depressions on the coast are occupied by bays and gulfs giving a very complex coastline. The straits which separate the islands from one another and from Sweden are former valleys, once occupied by northward-flowing rivers. Of the beech forests which once covered the loamy hills all but a few scattered remnants are now replaced by fertile fields of hay, grain, sugar beets, and other root crops. It is chiefly around the old castles, such as that of Shakespeare's Hamlet, which were prominent at the time when this was the political key to the Baltic, that this forest is still kept as dark green islands amid the arable land. Prosperous-looking farmhouses reflect the high standard of agriculture. But the factor that makes this land especially attractive is the omnipresence of water—little lakes shaded by trees, but especially the sea which is visible from most of the higher points. Summer cottages border the beach. The east coast of Jutland, the Baltic zone of Schleswig, and the most southern part of Sweden show similar features.

Central Sweden, in spite of its thin mantle of soil, its meadows, and its fields of oats, tends to present a picture more like that of the Swedish Uplands with their dominant forest of conifers. In central Sweden this forest covers the slopes between which swift rivers run towards large lakes which are most attractive in their forest frame. The rocky islands along the coast remind us of Norway. Here, as there, they serve as a habitat for the fishermen. The large cities, where the power of the rapids and falls is used for manufacturing industries, suggest those of northern New England. Here, more than elsewhere in Europe, the cities are surrounded by true suburbs of the American type. At Stockholm and elsewhere attractive suburban homes, hidden under the pines, face narrow waterways between the islands where little steamers take care of transportation.

' *The North German Terminal Moraine* (II-7).—The second sec-

tion of the lowland of central Europe, the terminal moraine, forms a long zone of sandy hills, which sometimes attain an elevation of 900 feet. In the Jutland Peninsula it forms a very narrow strip. Then it bends eastward in Germany and extends into the Baltic states and Russia, broadening as it goes. In east Prussia where it touches the Baltic coast, long sandbars covered with wind-swept dunes enclose large lagoons, the so-called haffs. This Baltic Moraine, as it is called, shows a profusion of pine-covered sand ridges surrounding thousands of ponds and lakes where summer cottages stand beside sandy beaches. In some places fields of rye and potatoes replace the forest, but without disturbing the general impression of sandy forested ridges and sparkling lakes. Farther east in East Prussia, Lithuania, and northern Poland, the population of the moraine becomes more sparse, and for mile after mile one may see nothing but low pine-clad hills, lakes, swamps, and sandy plains. Yet even here all tracts of good soil are used, and the population is dense in proportion to the resources. This is a region of large estates.

North German Alluvial Plains (II-8).—While the icesheet was laying down the Baltic Moraine, its waters poured off to the south and joined those from the uplands of southern Germany and Czechoslovakia. Together these waters flowed westward to the North Sea. On their way they built a broad alluvial plain extending clear across northern Germany. In post-glacial times new sections have been added to this plain by rivers which have once more resumed their former courses to the Baltic Sea. Thus from Hamburg, Bremen, and Hannover eastward past Berlin to Warsaw and beyond we find one of the flattest parts of the great central lowland. Much of this alluvial plain is swampy and forested, but in large areas meadows prevail and are used for grazing. Near the cities the vegetable gardens and orchards in a marsh-like environment with narrow canals and broad pools remind one of Holland. Along the post-glacial valleys which run from south to north wheat, sugar beets, and potatoes reflect the fertile soil and form an interesting contrast to the rye and buckwheat of the sandy lands on the sides.

The Loess Zone.—On the southern border of the Central Lowland the conditions for farming become very favorable. This is due to a fertile loess of dark color, brought by dry winds which blew across the loose material laid down by the great floods which poured out of the melting icesheet. Because of this fertile soil, fields of grain, sugar beets, and potatoes surround a great number of prosperous-looking villages and towns. Moreover, here, as in the west, coal, lignite, and potash have encouraged the growth of modern industries.

(Saxony and Upper Silesia are examples of this. The industries of the latter are only a recent development, but Saxony is a long-established center of art and culture. Few cities are more charming than Dresden just on the edge of this zone where the uplands begin.

The Eastern Plain.—Towards the east the Central Lowlands widen and finally extend from the shores of the Arctic to the Black Sea and the Caucasus, while only the range of the Ural prevents a direct connection with the Siberian plain. Between the Urals and the Caspian Sea the lowland continues into Asia without a break. At the southwest it swings around in the other direction into Wallachia, as the Rumanian plain is called. In this vast lowland, differences of relief become of minor significance. Nevertheless the landscape varies a great deal, for the climatic factor exerts a strong influence.

Along the shores of the Arctic the snow cover melts in early summer and for a short time the *tundra* (II-9) attracts herds of reindeer which feed on its short mosses and grasses. Here the treeless scenery presents little except an unending monotony of tussocks of grass, beds of gray lichens, miry swamps, pale gray soil, and rocks. In winter the frozen White Sea contrasts strongly with the open harbors on the north coast of the Kola Peninsula which are influenced by the Gulf Stream so strongly that the Russian fishermen join the Norwegians in the search for cod. Everywhere, however, the tundra scenery is bleak, bare, monotonous, wet, and uninteresting to ordinary people.

(2) ***Eastern Coniferous Forest*** (II-10).—South of the tundra comes a great belt of coniferous forests in which multitudes of small pines, firs, spruces, and similar trees stand amid a perfect tangle of fallen logs. The trees rise from a soft, deep bed of gray lichens. Where the forest is crossed by the terminal moraines of the Ice Age, it is sprinkled with lakes and swamps. Broad rivers flow slowly through it, bordered by a dark green army of trees. In Finland the millions of lakes are bordered by bare granite rocks scraped smooth by the glaciers. Man's influence is still rather insignificant—clearings for timber along the rivers, some scanty fields—that is all. Here is the domain of the fur hunter, the home of the lumberman.

(3) ***The Mixed Forest*** (II-11).—Farther south, in the Leningrad and Moscow section, a *mixed forest* was the dominant feature of the landscape before man replaced it by crops. Nevertheless, in some of the wilder parts the auroch roamed in virgin forests until recently. In most parts trees are still so abundant that the peasants live in log houses. Long rows of sandy moraines, finding their greatest development in the Valdai Hills, give to some sections a mild relief with charming lakes bordered by pine forests. Most of the land is flat,

however, often even marshy, and the rivers wander in circuitous courses. Along the Polish frontier of Russia the marshes are so huge that they form a real barrier between the two countries. Here the zones of European agriculture continue eastward—the fields of barley, flax, and oats, followed southwards by rye and potatoes. There are also some meadows for hay, but, although cattle are found everywhere, they are scarce compared with western Europe and do not form a characteristic feature of the landscape as they do in Holland, Denmark, and Ireland.

④ *The Black Soil Belt* (II-12).—More southern latitudes, a longer summer, and less effective rain bring us to the famous Russian *black soil belt* with Kiev as its representative city. Most of the land is softly rolling, but steep escarpments border the west side of the large southward-flowing rivers. West of the Dnieper the rivers have eroded rather deep valleys in the Podolian Plateau. But this does not destroy the general impression of immense level fields of wheat, which in late summer mantle vast areas with a golden cover, only interrupted here and there by large plots of sugar beets, blue flax, and sunflowers. The dark soils are themselves the product of limited rainfall and of the grass which therefore replaces trees. This grassy cover, where the herds of Asiatic invaders once roamed, has now been replaced by grain fields where Soviet farms mow down the golden heads on which the life of millions of farmers depends. Here whitewashed adobe houses stand in compact groups, replacing the log houses farther north.

The Southern Steppe (II-13).—Once more the picture changes, for increasing dryness causes the next strip of Russia to be the dry *southern steppe* which lies south and east of the black soil region near the north shores of the Black and Caspian seas. Here also fields have replaced most of the former steppe. Nevertheless, a part of the steppe is still left, and large herds of cattle graze on the flat grassy plains, which during the hot summer look parched and brown. Small salt lakes, surrounded by saline vegetation, show how dry the country is. The driest part of this southern steppe on the shore of the Caspian is one of Europe's few unproductive regions. Towards the Caucasus, however, the rainfall increases once more. Wheat fields reappear, but corn now enters as the main crop, while the high range of the Caucasus with its snow-capped summits and forested slopes forms a worthy European frontier.

The Central Uplands (III in A42).—South of the Central Lowlands and far less extensive but much more varied, the Central Uplands form an almost continuous zone of basins, plateaus, and mountain ranges from the Atlantic shores of the Iberian Peninsula to

Poland. The Spanish portion of these is cut off from the rest by the Pyrenees which belong to the Alpine section of Europe. Intermediate between the Central Lowlands and the Alpine mountain system, the Central Uplands resemble the Northwestern Uplands in the fact that generally they provide an environment unfriendly to human occupancy. Nevertheless, the fertility and industrial development of the valleys and basins which separate the various subdivisions make up for the inhospitality and sparse population of the higher sections. Here, as in the Northwestern Uplands, a peneplained surface has been uplifted. It has also been broken, thus supplying many easy routes across it and in this way diminishing its barrier qualities. Beginning at the southeast the Spanish Meseta is separated from the next section of the Central Uplands—the Central Plateau of France—by both the high Pyrenees and the low Aquitaine Basin. East of the Central Plateau of France the Rhone-Saône Valley, approaching the headwaters of the Seine, cuts across the Central Uplands. Then come the Vosges, Eifel, Ardennes, and other uplands west of the Rhine in France, Germany, and Belgium. The Rhine, with its great “graben” or depressed block of the earth’s crust in the south and its famous gorge in the north, provides another route across the Uplands. Next the Central German Uplands and the Bohemian Plateau present a highly irregular mass of hills and low mountains. The Oder Valley where it approaches that of the Morava separates them from the small plateau basin of Lysa Gora in Poland. Far away on the coast of the Black Sea the most easterly bit of the Central Uplands is found in the low plateau of the Dobruja in Rumania.

123 *The Spanish Meseta* (A and B in III, A42).—In the Spanish portion of the Central Uplands mountain ranges enclose an interior basin, the Plateau of Castile. Because of a dividing range, the Sierra de Guadarrama, this has a double character, with the basin of Old Castile in the north and that of New Castile in the south. It would have been allowable to include with these certain other basins of a lowland character, namely those of the Ebro in the north and of Andalusia in the south, but these will be treated with the Alpine system to which they are structurally related. The plateau quality of the Meseta is very evident in the north, east, and south where steep escarpments rise abruptly from narrow coastal plains or even directly from the sea, as in the north, or else from interior lowlands like the basins just mentioned. In the west there is no such perfect physiographic boundary. The transition from the plateau to the Portuguese coastal plains is more gradual. Nevertheless, broken, rough topography separates the plateau and the plains as well as any mountain range

could do, and has for centuries determined the location of the boundary between Portugal and Spain.

7 *The Spanish Border Ranges* (III-A).—When seen from the Bay of Biscay the Cantabrian Mountains in northwestern Spain rise as a great mountain wall. Because of the marine Western European climate—mild winters, cool summers, and plenty of rain—the scenery is very different from that which is generally associated with Spain. Densely forested mountain slopes, grassy meadows where cattle graze, fields of corn and rye, individual farmhouses with apple orchards, and coastal towns full of the bustle and noise of an industrial development resulting from coal and the mineral wealth of the hinterland—these things taken together give a picture which is typical of western Europe but supposedly not of Spain. The scarcity of level land and the shortness of the narrow river valleys limit the possibilities of human occupancy, and the straight, wave-beaten coast with its frequent rocky bluffs does not favor seafaring.

In the extreme west, in Galicia, conditions are more favorable, although isolation from the rest of Spain is a handicap. Here the ranges run out into the Atlantic, causing the “rias” type of coast where long bays invade the land and are protected from winter storms by rocky promontories and coastal islands. At the heads of the bays broad valleys run inland causing the general level of the land to be lower than in the Cantabrian Mountains. Hence much more can be cultivated; and prosperous towns and villages line the valleys. Nevertheless, the favorable coastline and the abundance of fish attract the inhabitants to the sea, and here, as on the coasts of the Northwestern Uplands, fishing and navigation are important.

The other border escarpments of Spain, which often take the form of mountain ranges, reflect the summer dryness of the Mediterranean climate. In the west, to be sure, the ranges along the Portuguese frontier are fairly well forested, but along the edge of the Ebro Basin and on the east coast the lower slopes are almost bare. The vegetation has changed completely: gone are the dense forests of the northern mountains; the vegetation is of an open, grassy type with scattered oak trees, or else the trees are replaced by the Mediterranean scrub or maquis, a garden of blossoms during the rainy season but scorched and tawny during the hot dry summer. Olive oil replaces butter as fat; wine replaces cider as the national drink. The irrigated fields of wheat and various kinds of tropical fruit in the valleys and coastal plains contrast with the non-irrigated crops in the northern mountains. On the high slopes pines dominate, while the open grassland, or *paramo*, snow-covered in winter, attracts the

herds of sheep in summer when the inland steppe is parched by the summer sun.

) *The Spanish Basins (III-B).*—Within the frame of mountains which stand on top of the escarpments, the basins or plateaus of Old and New Castile take the form of elevated interior plains. The relief, although generally gentle, changes in quality from the flat eastern parts, where young rocks lie horizontally, to the more rolling west where older and more varied rocks come to the surface, and the rivers, following the general incline towards the west, have eroded deep canyons. Aridity prevails everywhere except at the highest altitudes such as the forested hills of the Sierra de Guadarrama which provide the inhabitants of Madrid with ski grounds in winter and cool shade in summer. \Elsewhere marine influences are almost excluded by the mountains. |The dryness increases toward the south| (in the southern III-B of A42), where “La Mancha,” made famous by Cervantes, is almost unproductive and only serves as a feeding ground for sheep in winter. In many parts of the plateau one can often drive full speed for hours over smooth, hard, and almost deserted trunk highways built under the auspices of the dethroned king, but the minor roads are very poor. \Here and there steep rocky slopes rise precipitously for a few hundred feet to a *mesa*, or table, whose top in turn affords another level surface extending for many miles/ \In winter the plain is green with young wheat, or red| where the soil has been freshly plowed. In rainy weather the villages of stone or untinted adobe look pitifully poor and wretched. But when the sun shines in the bluest of skies, there is marvelous charm in the distant view of a little town of whitewashed houses, or of an ancient city built around a cathedral or castle which stands out against the clear sky amid an immense plain green with grain or grass and dotted perhaps with grazing flocks of sheep. In summer the plain is brown, the whitewashed houses glare painfully, a cloud of dust hangs over the land, and the air rises quivering from a hot surface whence signs of life have almost disappeared.

) *The Central Plateau of France (III-C).*—Between the Garonne Basin and the Rhone Valley lies an upland of a general rounded shape except for a northward extension west of the Saône Valley. This upland is most impressive when approached from the south/ Here above the flat Mediterranean coastal plain, where/long sandy bars enclose shallow lagoons/ and above the rolling foothills famous for their vineyards, rises the steep wall of the Cevennes./Narrow valleys, the lower slopes planted with olive trees and the upper covered with chestnuts, lead to the top of this high escarpment./ From the crest

the general level drops very gently towards the north and west as indicated by the river courses, but the general aspect is that of an old surface of erosion studded with gently rounded hills. In the southwest the limestone of "Les Causses," the region described by Robert Louis Stevenson in *Travels with a Donkey*, causes the plateau to be merely a dry, bare pasture land for sheep, and only the red soils around the sinkholes can be used for meager crops. Sometimes the plateau is suddenly interrupted by an almost perpendicular drop into a deeply eroded, steep-sided canyon like that of the Tarn River where a warmer climate permits a sort of narrow oasis with fruit and vegetable gardens between the blinding white limestone walls.

The old erosion surface mentioned above is also broken by genuine rift valleys forming depressions below the general level, and by frequent volcanoes which have left lava flows and cones. The rifts are illustrated by the fertile croplands of the Limagne, a structural valley through which the Allier flows northward past Clermont Ferrand till it combines with the Loire. The volcanoes are illustrated by the symmetrical cones (Puys) of the Auvergne close by on the west, where large herds of cattle graze at high levels. In many places volcanic dykes protrude above the general relief, forming little plateaus bordered by perpendicular walls, such as the famous ancient stronghold of the inhabitants of Gallia against the invading army of Caesar. Elsewhere bizarre volcanic needles stand out sharply. Springs of high mineral content, like the famous one at Vichy, have become resorts where recovery from illness is sought.

Taken as a whole, this complex picture of fertile plains, grassy uplands, and forested ridges may be attractive, but the elevation gives it a raw winter climate and the relief limits its economic value. Therefore, whereas the sunny valleys were centers of early occupancy, as shown by the prehistoric caves along many streams, the uplands themselves have only a sparse population, which is one of the most backward of France. From a racial standpoint these uplands stand out because they were used as a refuge in times of migration from the surrounding lowlands. Traces of the ancient Cro-Magnon people, who lived in Europe with the reindeer and buffalo during the Ice Age, can be recognized among the present inhabitants.

The escarpments of the Côte d'Or and of the Plateau of Langres (III-E) project north and northeast from the Central Plateau of France connecting it with the Vosges. Both are part of the outer rim of the Paris Basin, and take the form of a rather steep escarpment facing east or southeast with a gentle slope on the Paris side. On the steeper, sunnier slope the dark grapes of Burgundy bask in

the summer sun, while down below in the flat, fertile Saône Valley rich crops are raised and cattle graze on the poplar-bordered river floodplains.

33) *The German Uplands.*—The French Vosges (III-F) in the south and the Belgian Ardennes (III-G) in the north form the western wing of the upland complex which is combined here with the main part of the German Uplands (III-H). The eastern wing borders the Bohemian Plateau (III-L), although still farther east the wooded hills of the Lysa Gora (III-M) show upland conditions, and break the monotony of the Polish plains with their wooded slopes/

/The German Uplands taken as a whole are many-sided in their topography. /Granite massifs have been rounded by ancient glaciers; clear glacial lakes are surrounded by a mantle of conifers;/rolling plateaus with moorland vegetation resemble the Northwestern Upland; /old volcanoes are still recognizable because of their conical shape; and long forested ridges enclose fertile lowland depressions/

It is difficult to give an impression of such a region without going into detail, but some generalizations are possible. Perhaps the forests are the most impressive feature. They consist partly of oak and beech forming an extension of the former great lowland forest, but principally of conifers giving a dark green color to the landscape. /Narrow valleys, followed by roads and railroads and punctuated by picturesque little villages built along the river courses, wind their way between the forested slopes./ Where the valleys widen the villages grow larger; meadows border the stream, and crops of rye and potatoes are raised on the cleared lower slopes. Often inns and hotels reflect the importance of tourists in summer when pleasant walks can be taken along shaded paths and in winter when there is skiing over upland trails. [Wide open basins, such as that of Thuringia, show a dense population.] Small but attractive towns amid fields of golden grain and orchards of richly colored fruit reflect the quiet beauty of the land. Waterpower, derived first from old-fashioned waterwheels and later from large plants fed from lakes held by dams, has fostered manufacturing. \First came home industries, producing not only such things as cuckoo clocks and toys, but also tools of great precision such as technical instruments; later came big industries which with their smoke and noise disturb the clear silence of the forests,\ while ugly blocks of brick houses replace the old homesteads with their frame architecture. \This is especially true along the northern margin where Europe's main manufacturing region borders the uplands and in many places extends into them, based everywhere on the thick coal layers laid down in ancient geologic times along the old continental

border. Along the edge of the Ardennes in France and Belgium; in Rhineland, where the Ruhr, a small branch of the Rhine near Essen, has given its name to one of the world's greatest aggregations of industry; and farther east in Saxony, huge manufacturing plants and urban developments everywhere invade the upland hills and valleys. They make this upland border a region of modern scientific production, but ruin the former vistas of rural beauty.

Central Europe's most important rivers are associated with this central section of the uplands. The Meuse and Oder border it to the west and east; the Weser is entirely an upland product, while the Elbe from Bohemia breaks through the surrounding mountain wall by way of a beautiful gorge bordered by almost perpendicular walls of sandstone. But the most important of all is the Rhine. From Switzerland it follows the Rhine graben (east of III-F), the wide rift between the Vosges and Black Forest. Protected by higher elevations on every side, this rift valley is central Europe's most favored spot. Its carefully cropped lowlands, where many famous cities border the great stream, contrast strongly with the forested mountains round about. Out of this "graben" the Rhine breaks its way in a narrow gorge through the northern part of the Upland till it reaches the North Sea lowlands. The Rhine gorge is Germany's most popular tourist valley. It is so narrow that rocky slopes sometimes rise directly from the swift-flowing river, and rapids have had to be tamed in order to facilitate navigation. Nevertheless, it has had a remarkable influence on human life and activity. The almost continuous procession of steamers and long barges pulled by tugs, the numerous villages and towns built along the shores, the railroads and roads on both sides which often have to be carried through rocky cuttings or even tunnels, the steeply terraced slopes covered thickly with vineyards which produce the famous Rhine wine, the ruins of ancient castles, once strongholds on one of Europe's most famous trade routes, and at the top of the slopes on both sides the gently rolling upland with its fields of grain—all these combine to make the Rhine a subject for song and folklore, an object of national pride and reverence.

The Bohemian Basin (between III and L in A42).—This last main section of the Central Uplands does not differ greatly from the preceding one. Like the Iberian Peninsula, it is enclosed within a mountain frame, open only at the south where the ancient rocks of the Bohemian massif border the young deposits of the Alpine piedmont. These densely forested mountain walls make the climate of the interior basin somewhat continental, but they are not high enough

to hamper the utilization of the land. On the contrary, agriculture is highly developed, for the black soils are of great fertility and the fields of grain and sugar beets show how man responds to such favorable conditions.

The basin is not a flat product of sedimentation like part of the Meseta, but shows the rolling relief of an ancient surface which is largely intact but partly warped and broken, as is evident from many signs of volcanic action. The result is a pleasant picture of forested ridges and beautiful valleys, of rolling hills cultivated with fields of grain and sugar beets, of cities whose ancient towers border the river courses surrounded by vegetable gardens and orchards. In some of the valleys, just as in the French Central Plateau, world-known spas have developed, basing their existence on mineral springs. Here, as in Germany, manufacturing has entered the rural picture, using the power of coal and lignite, but principally based upon the former home industries. So the Central Uplands, in spite of their variety of relief and scenery, represent a unit, contrasting strongly with the flat or rolling lowlands north of them, while lesser elevation and smoother forms differentiate them from the Alpine System to the south.

CHAPTER V

THE ALPINE DIVISION

Complexity of the Alpine Division (IV-A42).—Because of the great complexity of relief and consequently of human activities, the southern division of Europe—the Alpine region—is difficult to treat as a unit. In many ways it is more a geological than a geographic division, but one great fact combines geology and geography—the fact that the relief of the mountains dominates human life. Mountains enter everywhere into the explanation of man's activities. They may be high ranges or isolated blocks, they may be greatly dissected or show an almost undisturbed plateau character, they may enclose wide fertile valleys, frame intermontane basins, or border coastal plains, but they are always there and put their mark on man.

In contrast to the sparsely populated uplands of northwestern and even central Europe, or to the crowded Central Lowlands, the distribution of population here is very uneven. Europe's highest non-industrial densities are found in some of the coastal lowlands, while well-populated intermontane plains and valleys are often surrounded by the almost complete emptiness of the real mountains. In this way contrasts in man's distribution and mode of life are the characteristic anthropogeographic feature of the vast Alpine region, and it is these contrasts which justify the treatment of this zone as a unit. In this treatment the description will proceed from west to east, starting with the Sierra Nevada in southern Spain, following the Italian Apennines from south to north, curving around with the great arc of the Alps, and then proceeding along each of the two Alpine wings (the Carpathian-Balkan and the Dinaric Pindus ranges), which surround the Danube Basin and give rise to the complex topography of the Balkan Peninsula. Finally the description will take up two isolated portions of the Alpine region, namely the Pyrenees which are thrust like a wedge between two parts of the older Central Uplands, and the Crimea and Caucasus which represent the more northerly of the two lines along which the mountains of Europe merge into those of Asia.

Southern Spain.—The Spanish Sierra Nevada (IV-1 in A42) stands out best when seen from the Mediterranean. In summer above

the parched coastal hills rises a great mountain range, partly hidden from the eye by the omnipresent haze. Snow covers the higher parts. As one climbs toward the mountains, the green color of grass and forests on the slopes, contrasts strongly with the bare brownness of the hills lower down, and is very different from the dull sage green of the neighboring olive orchards. In the valleys and on the narrow coastal plains, mountain rivers, fed by melting snow, bring water which can be used for irrigation. In this way oases of almost sub-tropical character nestle at the mouths of valleys and extend along the valleys far into the mountains. These Spanish oases, with their abundant citrus fruits, are almost the only part of Europe where dates ripen and sugar cane profitably replaces the beets of more temperate regions. Wheat makes the Andalusian lowland—the depression (dotted in A42) between the Sierra Nevada and the Meseta—a sea of waving golden ears in spring, for it ripens early, helped by the winter rains. On the hills and lower slopes grapevines form bright green patches at that season. Olive groves, stretching almost continuously for miles and interrupted only by the whitewashed homes of country proprietors, retain the same color all the year. On the driest slopes, almond groves form lovely spots of pink while winter is still in full force farther north.

The Sierra Nevada contains the last strongholds of the Moors. Everywhere the utilization of the land still reflects the influence of these African invaders who brought prosperity and culture because in their desert home they had learned how to use a limited supply of water.

Mediterranean Islands.—The Sierra Nevada breaks off in the east against the waters of the Mediterranean, but remnants of its former continuation appear in the form of islands. First among these are the mountainous little Balearic Isles fringed with coastal palm gardens in the blue setting of the sea. Sardinia and Corsica are similar remnants of an old land connection, but of a much larger size. Geologically most parts of them are similar to the Central Uplands with mountain blocks and, especially in Sardinia, intervening lowlands. Nevertheless, in eastern Corsica the steep Alpine ranges reappear and almost perpendicular rock walls border the coast. The isolation of these islands is the result partly of the mountain environment and partly of the malaria that infests the unhealthy plains. This makes them very backward, but in these later years the swamps are being drained, roads open the mountain uplands, and modern progress invades regions until recently ruled by banditry and family feuds.

The most eastern and largest of these islands is Sicily. Along

the northern coast the mountains rise abruptly, forcing the dense population to cluster in the valley bottoms or else cling to slopes so steep that a vast amount of terracing is needed. Nevertheless, luxuriant groves of oranges, lemons, and other fruits, as well as vegetable gardens and fields of wheat, make the mountain slopes appear very fertile and beautiful. The culminating point of Sicily is the volcano of Etna. It is a low blue cone, perhaps with a wisp of smoke, when seen from the sea to the north. Near at hand from the rich Catanian plain or the Straits of Messina its densely populated but tree-clad lower slopes present a wonderful picture of fertility. South of the northern backbone of mountains Sicily consists mainly of treeless hills and plains where wheat is the main crop except where vineyards and irrigated orchards surround mud-walled villages.

Italy.—The next Alpine region is the Italian Peninsula of which the Apennines (IV-3), a continuation of the African Atlas, are the mountain backbone. Interrupted only by the narrow Strait of Messina separating Sicily from the mainland, they form a great arch around the deep depression of the Tyrrhenian Sea and terminate as the southern part of the horseshoe-shaped mountain frame of the Po Basin.

The Apennines themselves are not very impressive, as only in a few places is a really mountainous character attained. For the greater part a gradual slope leads to a rolling upland which, because of its raw climate, is not attractive to man. Shepherds guarding large flocks of sheep, and lumbermen exploiting the last remnants of a formerly widespread forest, are often the sole signs of human activity, while only the valleys show a dense population. Easy passes facilitate traffic between the two sides, and so the Apennines are only a minor barrier. Nevertheless, they serve not only to isolate the east coast, but also to make it drier and less habitable than the west. Although the mountains usually lack impressiveness, the bordering hills and lowlands make up for this. On the Adriatic side human occupancy is very limited; bare limestone tablelands decrease the arable land. Nevertheless, some broad lowlands with large fields of grain and vast olive orchards make Apulia, near the heel of Italy, a populous region.

Along the western border of the Apennines, Italy reaches its full beauty. Rocky peninsulas and islands, narrow coastal plains, broad river valleys, and softly sloping hills give a picture full of variety. Three examples will serve to illustrate the variety—the region around *Naples*, the lower *Tiber plain*, and *Tuscany*.

Many people think that *Naples* has the most perfect setting of any European city. The bay of *Naples* is semicircular and is bordered by two wings of rocky uplands which break up finally into islands.

The bare rock in its natural color rises steeply from the deep blue sea. Steep trails climb to the rolling upland where the white houses of the villages are surrounded by gardens full of fruit and vegetables, while grapes and olives grow on the terraced rocky slopes. The Roman Emperors had pleasure gardens here; artist colonies still testify to the rich color and beauty of the scenery. The inner side of the bay is closed by the perfect cone of Vesuvius, from the crater of which smoke rises constantly. Frequent eruptions have played havoc in the neighborhood; lava flows have destroyed towns and villages, volcanic ash has sometimes covered them completely, but the addition of young soil gives the lower slope and coastal plain an almost inexhaustible fertility. Hence Europe's densest agricultural population is found here; and an almost continuous sequence of towns encircles the mountains, while the inhabitants combine the grain and fruit of the soil with products of the sea—*frutti del mare* (fruit of the sea). . And finally the city of Naples, a curious mixture of modernity on a picturesque, almost oriental, background, extends along the bay shore while the suburbs climb up the slopes of the neighboring hills.

How different is the setting of *Rome*. The Tiber at this point has already entered the wide open plain of the Campagna Romana, which borders the sea. In its frame of fertile hills and volcanic cones, the plain presents a picture of emptiness and desolation. Herds of sheep wander around avoiding the swamps which breed the malarial mosquito. The straight, flat coastline offers no attraction to fishing or trade. And amid this, where little hills protect the plain against floods from the river and facilitate its crossing, rises Rome, the eternal city. But the picture of the Campagna Romana is changing—a strong government and modern science are reclaiming its marshes and changing the grasslands into fields of grain, while villages arise and modern harbor facilities bring new life to the deserted coast.

The last example is *Tuscany*, the Florentine country of sunny hills and fertile valleys, of dark blue crater lakes and rocky volcanic cones. Elevation and a more northern location temper the summer dryness. Grain fields and green meadows fill the valleys and depressions; olives and grapes are cultivated on the slopes. But the most typical part of the picture is the numerous towns. Their location on the crests of ridges or of steep lava dikes, and their medieval walls, show how protection against attack dominated their historical development.

Although the lowlands of Italy are usually of very limited size, the large Po Basin (IV-4) in the north is of outstanding significance. In its mountain frame, this plain which was once a gulf of the Adriatic

and is still growing in size, represents Italy's major region of production. Its rivers in their lower courses flow between natural levees and above the general level, and are still pushing the Po Delta out into the Adriatic. The scenery is rather monotonous with fields of rice, wheat, and corn bordered by mulberry trees and green meadows where cattle graze near the rivers. But on clear days the surrounding mountains are visible, and the Alpine glaciers, the providers of the power on which Italy's manufacturing is based, sparkle white in the sunlight while the towers of medieval castles and cathedrals stand out against the blue sky reminding us of the time when this was the center of European culture.

The True Alpine Region.—Rounding the coast of Genoa the Apennines merge into the *Alps* (IV-5). From the sheltered coast of the Riviera these famous mountains sweep in a huge curve through southeastern France and Switzerland, and diverge in Austria into two branches, the Carpathians and the Dinaric System. The Jura detached from the Alps in northwestern Switzerland, and the wide foreland bordering the Alps on the north in Switzerland and Germany, are part of the Alpine System. The Alps constitute Europe's greatest mountain range. Throughout most of their length from the south-facing slopes of the Riviera, where the Mediterranean subtropical richness finds its most northern extension, up to the place where the Danube Valley separates the Alps and the Carpathians, the main divide is above the summer level of the snow while the highest parts are clad in an eternal mantle of glacial ice.

The Jura (IV-6 in A42).—In the limited space available in this book it is impossible to give a complete description of the Alps. So a rather typical cross-section, from Basel in the north to Milan in the south, is chosen as a sample of Alpine scenery and human responses. Basel is located at one of the important foci in the relief of Europe. Towards the north opens the wide flat Rhine Graben bordered by the wooded slopes of the Black Forest and the Vosges. A gap toward the west, the Gate of Burgundy, connects the Rhine Valley with that of the Saône. South of Basel the long ridges of the Jura present the first sign of Alpine action, but around their eastern end there is an easy route to the Alpine foreland where most of the Swiss have their homes.

The Jura Mountains resemble the Appalachian System in the United States. Synclinal valleys are separated by anticlinal ridges, but are united by narrow gorges, the outlets of the drainage of the interior basins. Here, too, as in the United States, the folded ranges are bordered on the west by a plateau where the layers are still hori-

zontal and in which the main rivers on their way towards the Saône have cut deep gorges.

The Swiss Jura may lack the majestic splendor of the Alps, but it has many scenic attractions. The wide basins between the ridges are mainly grassland, a result of a moist, raw climate. Towns and villages have used the power of the streams for home industries in order to provide work during the long winter, and here was born the Swiss watch industry which finally outgrew its local origin and became a world factory. Rocky trails lead up the wooded limestone slopes of the ridges towards the broad, rolling, upper surface where cattle graze on flower-covered meadows. The highest ridges are located farthest south. Seen from the Swiss Plateau still farther south the Jura looks like a great mountain wall hemming in the plateau as far as the eye can reach. On the high summits the view southward towards the Alps is most beautiful. On clear winter days, when the plateau below is covered by fog, a sea of clouds reaches from the Jura to the Alps whose white peaks with blue shadows stand out in full beauty against the sky.

In spite of the easy route around its eastern end, the Jura is a real barrier to transportation, for its continuous sequence of anticlinal ridges offers no direct passages. Tunnels have been made to overcome this handicap, for the Jura lies athwart the main road of commerce between northwestern Europe and Italy.

*(The Swiss Plateau (7 in A42).—*The low plateau where most of the Swiss have their homes was once a deep water-filled depression between the Alps and Jura, a narrow offshoot of the ocean reaching far eastward. But the rivers and glaciers laid down their deposits, and uplift finally left the region as a part of the Alpine foreland with an elevation of 2,000 to 3,000 feet.

The Swiss Plateau may appear rather flat and uniform when seen from a bordering mountain summit, but in reality it shows a most pleasant variety. Broad valleys widened by the Ice Age glaciers, which once descended from the Alps, are flanked by softly sloping divides. Most of the land has been made productive. Fields of rye, oats, potatoes, root crops, and hay checker most of the country aside from the divides which are still forested. Appletrees border the roads and surround large farmhouses which stand apart by themselves. The neighboring barns shelter well-fed cattle which provide the well-known dairy products. But most of the Swiss live in the villages and towns where factories use the power of the Alpine rivers.

The main attraction of the Swiss Plateau is its lakes, drowned parts of river valleys extending often into the real Alps. Around the

outer or northern end of a typical lake, rounded, but rather steep, slopes reach down to the blue-green waters on which white steamers, locally called "swallows," glide gracefully from one landing to the next. Villages border the shore; chalets stand in orchards which in blossoming time offer an eldorado of color. The slopes themselves are mainly in grass while the deep-cut valleys are wooded. Higher up, conifers prevail and their dark green color sharply accentuates the line of the ridge against the sky. If the lake runs east and west the warm north side, facing the sun, will be covered with terraced vineyards, and orchards, or used for vegetables and flowers, while the cool south side, facing away from the sun, will be left to grass and forest.

Towards the mountains the picture of a typical lake changes. The slopes beside the lake become steeper and higher; perpendicular walls of rock often rise directly from the lake, forcing the roads and railroads to betake themselves to tunnels. Villages are now restricted to the deltas or alluvial cones at river outlets. To find other habitations one must climb far up to the Alpine meadows which cover the terraces at the tops of the rocky slopes. Still higher up white snow and glaciers sparkle in the sunlight. Once more, as in Holland, we find a paradise of color—the blue-green of the lake, the dark green of the conifers broken by bare black rocks, the light green meadows, the white snow, and the blue sky above.

But this picture of the Swiss lakes is far from always true. Many days are rainy, and strong west winds sweep the waves against the drenched shores. In winter unpleasant fogs often hang over the plateau and only the higher slopes rise above this cloudy mantle.

The Alps Themselves.—South of the plateau we come to the real Alps. The lower front ranges are rounded by glaciers, but more rocky and much higher than those of the plateau. The slopes are still mostly forested but grassy terraces interrupt the pines, while, above the treeline, flowers form a colorful carpet on the dark background of green grass. The valleys are still wide and open because they were scoured into a U-shape by old glaciers. Some crops can still be raised, but grass prevails in most places. The valley roads follow the fast-flowing rivers from village to village where brown wooden farmhouses with overhanging roofs and balconies on all sides surround the churches.

Farther toward the heart of the mountains the signs of human influence become less. The mountains dominate. The valleys become narrower and stonier, the slopes steeper, and glaciers form a part of the picture. Man comes in only temporarily, following his cattle along

the grassy terraces up to the snowline, or walking up a winding mountain trail to a cabin whence the next day's ascent of an important peak will be made. In winter the man on skis draws his long zigzag trail across the snow. Here the lover of the Alps finds his haven. Sitting before the little cabin in the evening, tired after a day of climbing, he looks over the sea of ice-capped summits glowing in the sunset while dark shadows hide the valleys. The mountain silence is interrupted only by the occasional noise of a falling rock or a snow avalanche, or by the whistling of the marmots who sit upright before their rocky holes. The Alps may have been partly spoiled because "tourism" exerts such a charm upon all sorts of people; modern hotels may look strange in the mountain environment, and some summits can be reached while sitting comfortably in the well-cushioned seat of a modern railroad, but the Alps are still beautiful and many sections are remote and peaceful enough to satisfy the most exacting lover of nature.

The High Alps in Switzerland take the form of a double range separated by the longitudinal valley of the Rhone-Rhine. The French Alps show this same double tendency, while in Austria two longitudinal valleys separate the mountains into three high ranges. The longitudinal valleys, a product probably of warping, but remodeled by rivers and glaciers, form a distinct unit in the Alpine region. Even amid the higher peaks, they are comparatively wide with flat bottoms that can be used for crops, or at higher elevations for hay. Mountain walls to the north and south give a dry touch to the climate, so that the sun-facing northern slopes are among the best regions for grapes. Apricots also ripen, while on the high terraces the larger amount of sun favors the location of health resorts. Power plants are located where the mountain streams leave the side valleys which lead far into the mountain core and tumble down the sharp drop towards the over-deepened main valley. Railroads use these major valleys as convenient places from which to cut through the Alps by means of tunnels. Numerous villages and little towns show that the density of population is relatively high in the valleys although very low outside them.

In Switzerland the second or southern high range is the most prominent. Great peaks sculptured by glaciers rise steeply out of a rather high and relatively flat ice-clad surface. Far below this surface the deep river valleys form ribbons of green trees and grass, while glacial tongues extend into the zone of human occupancy.

The south slope of the Alps is rather abrupt, and the low plain of the Po is only 50 miles in a straight line from the crest of this

second high Alpine range. The steep inclination together with the heavy precipitation has resulted in a much-dissected relief. Deeply eroded valleys with steep terraced slopes lead down towards the blue lakes which, as in the north, occupy the portions of the valleys adjacent to the plain. But the picture here is different. Favored by the protection of the northern mountains and by the greater amount of sunshine of a climate which has here become partly Mediterranean, the Alpine piedmont is almost subtropical. The shores of the lakes display gardens of almost luxuriant vegetation where oranges and lemons can actually be raised in the latitude of St. Paul and Minneapolis. Corn ripens on the valley bottoms, while grapevines climb high up the slopes where majestic chestnut trees are typical. Early spring, when the mountains are still snow covered, and the light green foliage and pink blossoms of the fruit trees are reflected in the deep blue lakes, is here most beautiful. But fall almost rivals spring, for brilliant autumn colors merge into the new snow on the high slopes while the gray-green color of the evergreen borders the water-front.

Although the picture of the Alps varies according to local conditions, their influence on human life and activity is everywhere much the same. Man in this mountain environment has to face many hardships. Arable land is rare and except on some valley bottoms infertile. The Alpine meadows where the cattle graze in summer are far away from the regular villages, which necessitates the use of temporary dwellings. Often the villages are a long distance from the main roads of commerce and from the markets where the farmer has to sell his surplus and buy what he needs. Moreover, the summers are short, and the long winter greatly limits human activity. The result is a group of hardy people fond of their mountains and eager to defend their freedom. Out of these mountains came the spirit of democracy on which the Swiss Republic is based; from them came such men as Andreas Hofer, the Tyrolese hero of Napoleonic days, who gave his life for the freedom of his land.

The isolation arising from the rugged relief of the Alps is evident in many diverse ways. Thus in eastern Switzerland the Rhaeto-Romans, a remnant of an ancient ethnographic group, still preserve most of their linguistic and cultural characteristics. In a similar way in one of the highest villages of the French Alps the authors found a small group of Protestants whose ancestors escaped the furore of the French St. Bartholemew period and continued to follow their own creed.

In spite of all this the Alps have been remarkably unimpressive

as a means of separating northern Europe from the Mediterranean. All through history people have faced the danger of crossing the high Alps when it was necessary. From the time when Hannibal crossed them with his elephants until the World War when the Austro-German army swept down the slopes of the Austrian Alps to invade the Italian plain, armies have been brought across successfully. Likewise political boundaries have not been located on the Alpine crest but have been carried across it. The Po Basin was for centuries under Austrian rule, and only as recently as the World War were the frontiers of Italy carried up to the Alpine summits. This leaves only the Swiss canton of Ticino as a southern offshoot of northern rule.

Modern means of transportation prevail in the Alps in spite of high expenses; tunnels connect low valleys on the opposite sides of the ranges, leaving only a comparatively small inclination up to the tunnel entrance; modern motor roads wind up to the passes known long ago to ancient merchants, and cars sweep swiftly past the summit hospices where once the weary traveler found a welcome refuge. At the Simplon Tunnel, for example, one ascends very gently and easily to a height of 2,313 feet and then travels $12\frac{1}{4}$ miles on a level instead of toiling up to a height of 6,592 feet at the top of the pass.

The Carpathian Curve (8 in A42).—The Vienna Basin, a structural depression through which the Danube breaks its way on its eastward course, marks the transition from the Alps to the Carpathians. Beyond it to the east, sandstone ranges of soft rounded forms, completely forested except for some high elevations, curve in a large half circle from Vienna far around Hungary to the Iron Gate. The Carpathians lack the beauty and splendor of the Alps, and only the High Tatra in the west central part is lofty enough so that glacial forms once more prevail and steep, ice-polished walls of cirques enclose mountain lakes surrounded by stately conifers.

Inside the eastern bulge of the Carpathians, where the mountains start their horseshoe curve around the Rumanian plain of Walachia is located the Transylvanian Basin (9) which is separated by the Bihar Plateau (10) from the Hungarian lowlands (15). The rolling topography of this Rumanian Basin, with its alternating woodland and fields, contrasts sharply with the dark green slopes of the surrounding mountains. Narrow passes and gorges open through the mountains toward the south where the steeply dissected forested mountain slope gives way abruptly to the flat plains of Walachia which in summer present a sea of ripening wheat and corn.

The northern foot of the Carpathians is bordered by a wide foreland. It begins beyond the Moravian gate which lies a hundred miles

north of Vienna and connects the fertile valley of the March with the northern lowland plains. Then it circles around through the Plateau of Podolia. This part of Poland and Russia is dissected by north-flowing rivers and forested on the higher divides. Most of it is cultivated, and the rich dark soils produce crops of wheat, corn, and tobacco, while the many agricultural settlements are surrounded by orchards and vegetable gardens. The little whitewashed, mud-walled, thatched cottages of the villages are very picturesque and so are some of the big estates which still survive from the old régime, but one feels that as one goes eastward the prosperous, progressive part of Europe is fast being left behind.

Taken as a whole the Carpathians, in spite of a number of rather easy crossings used by roads and railroads, constitute a barrier separating two densely populated lowlands. The barrier is a narrow, almost empty zone, in which only the axe of the lumberman and the barking of the shepherd dog break the silence of the forest. During the World War this forest barrier stopped the advance of the Russian armies which threatened to invade the fertile crop lands of the Danube Basin.

The Balkan Mountains (13 in A42).—The Carpathian Mountains are separated from the Balkans by the Iron Gate, where the Danube breaks through the mountain wall by way of a winding gorge. This gorge is often mentioned as Europe's historical entrance from the east, but the narrow valley is even now a handicap and the railroads have to use another break in the mountains just north of it. The Balkan range, the end of the northern Alpine wing, is much like the Carpathians. Passes are few, and the relief is rugged for some distance on each side of them. Thus the mountains with their forests and grasslands make a pronounced separation between the grain fields on the north and the more southern valleys where vineyards and rose gardens show a response to a more protected location and a milder climate.

The Dinaric Wing of the Alpine System (11 in A42).—Returning now to the eastern end of the Alps proper, let us examine a region of a totally different aspect. The eastern coast of the Adriatic Sea shows a distinctly Mediterranean character. Rows of islands running parallel to the coast are remnants of partly drowned border ranges. The rocky coast, where towns of ancient fame are surrounded by gardens of subtropical luxuriance, rivals the Norwegian coast in scenic beauty. But a white limestone wall of mountains rises almost immediately from the shore, and a dry, inhospitable karst plateau replaces the coastal oasis. Here the bare limestone gives rise to

one of the most unproductive parts of Europe. It is often so white that the country is almost as dazzling in summer as when deep snows cover it in winter. Only in the lower limestone depressions can *terra rossa*, or red soil, be found for wheat and corn. Only there do little villages break the otherwise almost total emptiness of the plateau. Undrained hollows of the typical karst formation are common. Some streams plunge into deep holes dissolved in the limestone, and in many places the water that flows into the cultivated depressions disappears underground. It emerges in great springs after flowing many miles in underground channels. Some such springs burst out under the sea along the coast and provide sweet water in the midst of the ocean brine.

Southwards in Albania the limestone ceases to exercise so dominant a control over the relief. Here the Dinaric System reaches its highest elevations, and peaks that were once glaciated rise high above the upper limit of the forest. Lower border ranges separate the main chain from a swampy coastal plain, and fertile valley basins closed by deep gorges offer advantageous living conditions although mountain isolation has caused cultural backwardness.

Greek Mountains and Basins.—The southern continuation of the Dinaric System, the Pindus ranges (12), passes through Greece, bends towards Asia Minor, and strikes out across the Aegean Sea in lines of islands. Faults have broken the curved mountain frame, and the resulting relief is very complex. The whole region is divided into individual blocks separated by depressions. Some of the depressions form the typical Greek basins in which little city-states grew up of old. Long slopes of alluvial material spread out from the base of the mountains and merge into a plain. The upper, gravelly part of such a slope and the adjacent mountain slopes are green with grass and gay with flowers for a short time in spring, but during most of the year they are brown and bare—fit only for the pasturage of sheep and goats. Higher up, the mountains are scantily forested in some places, but the former forests and even the soil that supported them are now largely gone. Nevertheless, wherever springs supply water, the mountain sides are terraced for wheat, grapes, and figs. Olives and some grain are raised without irrigation, and flat-roofed villages of mud or stone appear. Down in the plains where the soil does not become dry so quickly, larger fields and larger villages support the main population. Some depressions have been drowned by the sea and give rise to the sequence of bays and gulfs which is so characteristic of Greece. Indented coasts where a colorful mountain wall rises steeply out of the sea, rocky promontories of fantastic shapes, high mountain blocks

where goats look for food on the once forested but now often bare slopes, and also fertile valleys and basins with fields of wheat supplemented by vineyards and olive trees on the bordering hills—all these together make Greece.

Because of the many indentations the coast is generally near at hand, and from the mountain tops the blue sea forms a background for the local panorama. Islands border the land. The beautiful Ionian Islands, where once the German Emperor sought relaxation, flank the coast on the west. In the Aegean the numerous islands, some large and some mere whitish rocks with patches of green in the blue setting of the sea, represent what is left of the former link connecting the Pindus with the mountains of Asia Minor. It is easy to see why here, as in the northwestern uplands, the limitations of human activity imposed by hostile relief of the land impel man to look toward the sea for his main field of interest. The ancient Greek culture was marine in character and spread out along the coast of the eastern Mediterranean. Today Greek fishing boats, like those of old, still sail out to catch the fish so valuable to the Greeks as a food. Greek vessels still interconnect the many coastal settlements isolated in their mountain frame, or sail to the surrounding islands and coasts where Greek influence prevails. Greece and Norway have followed similar paths of development because the sea gave what the land missed—a unifying element.

*[The Hungarian Basin (15 in A42).—*Between the two Alpine wings discussed above, and enclosed entirely by them, lies the Danube Basin or Alföld. Once a great inland water body, it was filled by alluvial river deposits and drained by way of the Iron Gate. Now only a few shallow lakes can be considered remnants of the former large body of water. An offshoot of the Alps, a long range of hills, separates the Little Danube Basin between Vienna and Budapest from the Great Danube Basin south and east of Budapest. Above the latter city the Danube River breaks through these hills in a beautiful narrow valley bordered by forested slopes. Otherwise, the relief is very flat and the rivers, bordered by wide floodplains, wind slowly over the level surface. Signs of a dry continental climate appear, sand dunes and open steppes, which once attracted the Hungarian invaders with their herds of stock. But the days of extensive utilization of the land for wandering herds and flocks are over. Only here and there is a small part of the steppe, or "puzta," still left for such use. The fertile soil is now largely cultivated and the plain in early summer presents a pleasant picture of immense fields of wheat and corn, while vineyards cover the sandy hills. The population is concentrated

in large rural settlements; castles of the Hungarian nobility still reflect the old feudal system. One of the most typical features is long villages built along a single shady street where ditches border the roadway, and the little whitewashed houses are surrounded by a few fruit trees and flowers.

The Balkan Peninsula.—Compressed between the Dinaric System in the west and the Balkan Range in the east the mountains of Serbia and Macedonia show the effects of pressure. South of the Danube the relief is still gentle with only here and there volcanic extrusions forming isolated mountains. Prosperous-looking villages surrounded by gardens of plum trees lie between gently rising slopes on which cornfields take most of the available space.

Southward the elevation increases. Steep mountain blocks, snow covered in winter but in summer the feeding ground of sheep and goats, border deep depressions which were once lakes but are now filled with alluvial soils providing rich crops for the inhabitants of the many towns and villages. But these basins have only limited possibilities for production. Mountain massifs, of which Rhodope (14) is the chief, surround most of them completely, permitting an outlet for the drainage only by way of narrow gorges. Thus here, as in Albania, isolation is the major factor. Because of its complex relief this region is the meeting place of Serbs, Bulgarians, Albanians, and Greeks, while Turks and Jews live in the cities, and Macedonians come into conflict with all the other races. Hence this region is an ethnographic as well as a physiographic puzzle, and is still a great danger point of Europe. From quarrels among these isolated groups, always ready to fight, war has spread over Europe and may spread again.

The Isolated Pyrenees (16 in A42).—Outside the main Alpine System there are a few ranges which are like it in their relief and origin, and hence should be described at this point. One of these, the Pyrenees, lies in the far west and forms a continuous mountain wall separating the Iberian Peninsula from the rest of Europe. Scarcely interrupted by accessible passes and only very recently pierced in two places by railroad tunnels, their majestic cirques with perpendicular walls crowned with eternal snow present an ideal natural boundary. In the west the Basques, a racial remnant of ancient times, have continued to exist because protected by the forested mountain environment against French and Spanish cultural advance. Farther east the small state of Andorra is based on the inaccessibility of an upper valley set in a frame of mountains. A rough mountain region, in which aridity still further diminishes the productivity, borders the Pyrenees on the Spanish side in Catalonia. There a dry steppe vege-

tation covers the Ebro Basin (17) and crops can be raised only under irrigation. But the Catalanian coastal ranges, shutting off this Ebro Basin from the sea, present a typical Mediterranean climate with cork oaks and olive trees on the slopes and grain fields, vineyards, and orchards surrounding the many industrial towns and villages.

The Isolated Caucasus and Ural.—Like the Pyrenees in the west, the Caucasus (19 in A42) with its extension in the Crimean Peninsula lies outside the Alpine ranges and is not an integral part of them. The Crimean Alps (18) are of minor elevation and show up as a range only when seen from the Black Sea. Their major significance is climatic. The protection that they render in winter against the cold winds from the interior gives the lovely mountain coast a climate which somewhat resembles that of the Riviera. The tremendous wall of the Caucasus shuts Europe off from the adjacent Near East. As a barrier it is almost perfect. No railroad crosses it, and the trans-Caucasian line has to go all the way around by the Caspian shore to connect the two sides. The high mountain scenery resembles that of the Alps, but the population is Asiatic.

Finally, the low rounded, forested Urals (20 in A42) with many easy gaps through which the railroads connect the two parts of the Soviet Republic, set a limit to Europe toward the east. The inclusion of these hills in the Alpine division is open to discussion, for the relief resembles that of the central European uplands, but their character as a long range, extending from the glaciers of Nova Zembla well toward the shores of the Caspian, gives them one of the main Alpine qualities. Their effect on man is slight, however, except in a few places where minerals are found. Where the climate permits agriculture they are so low and have such gentle slopes that they are easy to cross. Elsewhere they are heavily forested except where the forests give place to tundra in the far north.

CHAPTER VI

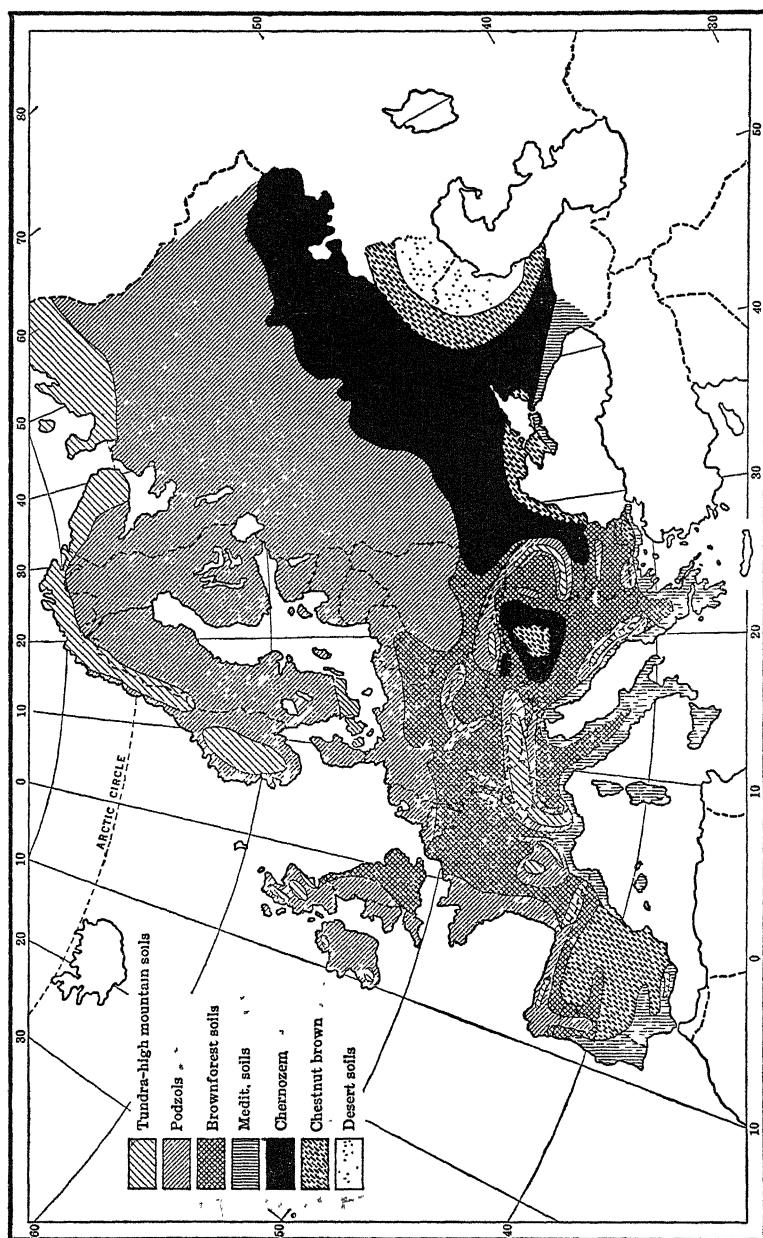
SOILS

Relative Importance of Soil.—In studying the soils of Europe local variations may well be contrasted with broad regional resemblances. The local variations may arise from chemical differences in the original rocks from which the soil is derived, or from differences in texture due to relief and the consequent conditions of erosion and deposition. These local variations are very obvious even to the casual traveler. Within a hundred yards he may pass from barren sandy soil, which is not worth cultivating, to dark rich loams producing the best of crops. On the sandy patches he may find only a few widely scattered and very poor farmers, and on the loams a dense and comfortable population of peasant villages.

In spite of these great local differences, the general distribution of European prosperity and progress bears little relation to the soil. This arises from the fact that when broad regions are considered the quality of the soil depends on climate even more than upon relief or the nature of the underlying rocks. The climatic effect is such that the best soils are found in climates that are relatively poor for both men and agriculture, for example in southeastern Russia. On the other hand, the regions that are best for man, and in which the yield of crops from year to year is most reliable, have relatively poor soil, as in parts of Denmark.

In addition to this, such factors as transportation, the distance of markets, and the scale of world prices, to say nothing of the growing use of fertilizers, have deprived the soil of much of its determinative influence, especially in progressive western Europe. In the eastern countries, however, the soils have been drawn upon for generations with little return in the way of fertilization, and there the density of population, but not the degree of progress, is still a fair index of the natural soil fertility.

The Soil Map.—A87 gives a greatly generalized picture of the distribution of the main European types of soil. It is very difficult, however, to put a rather complex distribution into a simplified form. This is especially true in southern Europe where the introduction of the name "Mediterranean" soils is more practical than scientific.



A—Soils of Europe.

THE PEDALFERS.—Leached pedalfer soils are typical of Europe with its generally marine climate. These, as the name implies, are rich in aluminum and in ferric or iron compounds. This is because the lime and other soluble portions have been leached out under the influence of a steadily moist climate. The four kinds of pedalfers recognized in A87 are based on temperature and differ because of latitude or elevation.

Tundra Soils (1 in A87).—The tundra soils of high latitudes in northern Scandinavia and Russia, and of high elevations elsewhere, are on the whole pale, gray, infertile, waterlogged, and young, with little or no humus. The precipitation may be scanty, although this is true only of the real tundras, and not of the high mountains, but the soil is usually saturated and consequently swamps are abundant. Not only does the low temperature prevent evaporation and keep the lower soil frozen all the time, but frequent freezing and thawing of the upper parts make the surface so irregular that the water does not flow off.

Podzols (2 in A87).—A little farther south or at lower elevations, but still in the north, more moderate temperatures allow the soils to improve somewhat. So the swamps give place to coniferous forests, or even, on the southern margin, to mixed forests of conifers combined with the broad-leaved type of trees. Chemical activity is still low, for high temperatures are an exception. The moisture content of the soil is high, and constant leaching takes place, except during the long winter when the ground is frozen. The podzols, as the soils here are called, are gray and acid, with a very low humus content. They cover much of western Europe, where they are a response to a constantly wet climate. They also extend eastward through the Baltic region and Russia with a slight northerly trend into Asia, where lower precipitation is balanced by lower temperature and less evaporation, so that there is still a great deal of leaching. In general the fertility of the podzols is low and they have to be heavily fertilized to become highly productive. Similar conditions prevail on the central European uplands and on the lower slopes of the Alpine ranges.

Brown Forest Soils (3).—In middle latitudes where the forest is mainly deciduous, the soils are less leached, better aerated, contain more humus, and are consequently darker than the podzols. These more mature brown forest soils are found generally in central Europe except on the mountains, and extend southward on the uplands of the Mediterranean peninsulas. Along the east side of Great Britain, where the climate is slightly continental because protected from marine influences by mountains, the brown forest soils extend into Scotland.

Similar conditions are responsible for the presence of such soils in Scania, the most southern tip of Sweden, and in the Danish isles where fertile loams with beech forests contrast strongly with heather-covered, leached sand in the Jutland Peninsula. (Wrongly shaded in A87.)

Mediterranean Soils (4).—Under this name are combined soils of different values, but all are the products of the same type of climate with mild rainy winters and hot, dry summers. There are decided differences, however, according to the amount of rain. In the more rainy sections where leaching is especially important, abundant moisture and warmth produce soils of a reddish color, because iron remains undissolved. In the leeward sections, where rainfall is lower, leaching is less common and the dry type of soil tends to prevail, as in eastern Spain, Attica, and the region west of Istanbul. One would expect the fertility of the Mediterranean soils to be lower than that of the brown forest soils, but young alluvial and volcanic deposits and a great abundance of limestone add greatly to their value.

PEDOCALS.—The pedocals, from the Greek words for ground or soil and *calcium*, or lime, are a type that has not been leached and hence contain much lime. Being a product of relatively dry climates, they are found in eastern Europe wherever low precipitation or high temperature causes leaching to lose its importance. Climatic conditions sufficiently dry for pedocals prevail on the Spanish Meseta, or plateau, as well as on the east coast of that peninsula, in some of the central European mountain basins, and especially in southeastern Russia and parts of Rumania.

Black Soils or Chernozem (5).—Many factors combine to make the *chernozem* or black soils of southern Russia the most fertile of the pedocals and thus among the best soils in the world provided they have the right temperature and moisture. Formed in a climate sufficiently dry so that they are not harmfully leached, and full of humus because of abundant grasses, they have plenty of lime and nitrates, as well as potash, phosphates, and other essential ingredients. Because of the humus the color is dark, nearly black. As the soils are fine grained and occur mainly on land with little relief, cultivation is easy. No forest has to be cut, no slopes to be terraced, and the soils are deep and retentive of moisture, even bringing it upward during the dry season by capillary attraction. The main development of black soils is in Russia. On the map (A87) they immediately join the podzols, although there is actually a zone of transition. From the Podolian plateau at the northern foot of the Carpathian Mountains and from the Walachian plains of the Danube in Rumania the Black Earth Belt extends towards Siberia in the east and the Caucasus in

the southeast. Soils of a similar dark chernozem type are also found in the Hungarian plain, although there the central parts are drier, more saline, and of the chestnut brown type. Others occur in the Vienna Basin, while small isolated patches (not shown on the map) exist in the Bohemian Basin, and in Germany at the foot of the Saxon Uplands. In spite of their richness, the main regions of the black soils do not produce large crops per acre, as we saw in Chapter I and shall see more fully later.

The Chestnut-brown Soils (6).—South and east of the chernozem soils increased dryness reduces the amount of leaching, and scarcity of vegetation reduces the humus. This gives rise to semi-arid, chestnut-brown soils which retain most of their lime and other soluble materials. Although less fertile than the black soils, they are nearly as rich, but the semi-arid climate limits their use. They are found on the Spanish interior uplands surrounded by mountain barriers, and on the eastern leeward coast where fertile oases exist provided water is available. In Russia they form a belt north of the Black Sea and around the Sea of Azov while increased continentality causes them to replace the black soils farther east towards the Caspian.

Desert Soils (7).—Desert soils, or grayeths, are a product of extreme dryness and are found in Europe only along the northwest coast of the Caspian Sea. Scarcity of humus is one of their defects. Another is due to the fact that the rains here commonly moisten the soil only to a depth of two or three feet, and very little seeps away to reappear in springs. On the contrary much of the water returns to the surface through capillary attraction. This evaporates and leaves in the upper soil an accumulation of lime and other materials which have been dissolved while the water was underground. Hence the upper portions of the gray or light-brown soil often contain a thin layer of hardpan, a hard, whitish, more or less saline material in which lime is the main constituent.

Soil and the Farmer.—It is difficult to define the part played by soil in the development of European agriculture and the distribution of the agrarian population. Although this subject comes into the realm of the following chapter on land utilization, it is worth while to touch it here.

Values of land and density of rural population vary greatly as a direct result of the soil, but this is true only of local differences. Examples, like the low density of population on the poor granitic soils of the French Central Plateau, the much greater density on the volcanic uplands, and the patchwise distribution on the limestone plateau, can be found all over Europe. In Russia a decline in the density

of the population can be seen both north and south of the Black Soil Belt, and this is in part due directly to diminished fertility of the soil. Taking Europe as a whole, however, so many other factors interfere with the direct influence of the soil that no general conclusions can be drawn. The stage of agriculture, for instance, may change the response to soil entirely; the earlier farmers preferred loose, easily worked, sandy soils rather than the clays and loams which are now much more productive. Then, too, fertilization can add missing minerals to the soil, leaving only the texture to determine the value. So it is not surprising that a map of agricultural productivity differs greatly from a map of soil. Nevertheless, it is rather a shock to see that in B7 the yield of wheat is highest in soil that is described as leached, and least in the black and chestnut soils described as best. It is still more disconcerting to find that this is true of practically all crops. The rather regular decrease in yield from the countries around the North Sea towards the east and south may be summed up by saying that in much of the famous Russian belt of black soil the yield of wheat per acre is only one fourth as great as in the leached podzols of Holland. A similar but less extreme contrast is seen between the poor North Sea soils and the better ones of the Mediterranean type.

Let us look at the alleged causes of this systematic difference in yield. It is said sometimes that in the east and south of Europe all the land is used for wheat, whereas in northwestern Europe only the best is selected. But the best land in the latter region is always allotted to crops like vegetables which bring a high return per acre. In countries like France, southern Germany, northern Italy, Austria, Belgium, Holland, Denmark, and southeastern England the rest of the land is devoted to crops which form parts of a general rotation. Each main type of crop is raised on each piece of land in turn. Hence the selection of the best land for wheat in the section of high yield plays no part in explaining the contrast between these richer grain fields and those of the east and south. Nevertheless, cultivation and especially fertilization are, of course, highly important. In the North Sea countries large numbers of cattle give the land the benefit of abundant barnyard manure. Commercial fertilizers are also added, although these are used for intensive crops more than for wheat. Also, the nearness of a market with a continuous demand for grain, and the low cost of transportation, both stimulate production. They do this by assuring the farmer of a ready sale for whatever he produces and of a good price because he does not pay much for transportation. Moreover, the higher cultural level of the farmer in west-

ern Europe makes him seek high profits per acre and hence use improved methods. All this is almost the opposite of the situation in the Russian chernozem region.

These differences between the eastern region of rich soil with poor crops, and the North Sea region of poor soil with good crops, are closely connected with climate. Even if we omit the climatic relationships of human health and energy, we find that the climate around the North Sea is peculiarly good for cattle, for wheat and other crops, and for steady farm work all the year round. Even if everything else were the same, the climate and the grass would make the cattle larger, healthier, and better producers of both milk and meat than the dry, cold, continental climates. Moreover, because the warm winters permit grass to grow freely practically all the year, pasturage is possible most of the time, and the amount of land needed per cow is at a minimum in the North Sea area. Thus there a given amount of land and of work, when devoted to cattle, will give much more meat and milk than in the black earth region. This makes it pay to keep cattle, and thus abundant manure is available to increase the yield of the poor soil.

The climate also helps the wheat far more on the poor North Sea soil than on the good Russian soil. The regions with a high yield of wheat per acre in B7 have a marine climate with mild winters and cool summers. The ideal climate for wheat has a long and rather wet winter, with little or no frost, prolonged into a cool and fairly wet spring, which fades into a warm summer, the weather growing gradually drier as it grows warmer. Except that the summer is occasionally too cool and wet, these ideal conditions are realized in western Europe. Contrast this with the long, cold dry winters of eastern Europe and the long, hot dry summers of the south, and it is clear that in spite of the poorer soil the growing conditions are much better in the west. Moreover, the process of fertilization is much easier in a mild climate with constant moisture than in a cold climate with dry spells and heavy showers. So long as the ground is frozen the fertilizer cannot become an integral part of the soil. If the soil is too dry, fertilizers are generally of little use because they are not dissolved and thus made available to the plants. If rains are too frequent and violent, as in parts of the Mediterranean, whatever plant food has been dissolved is likely to be carried away before the plants can get it. What the crops most need is steady but not excessive moisture. They need this not only in summer, but at other seasons as well, so that the fertilizers may be broken down and spread through the soil, thus putting the plant foods into such form that the plants can

steadily feed upon them. Nevertheless, the cool, moist summer has also disadvantages. The wheat raised as a response to such a climate is soft, lacking the glutenous quality of the eastern hard wheat. Moreover, many sections where the marine climate prevails, for instance western Ireland, are definitely too wet so that the wheat rots in the field. In exceptionally wet years, this may happen in more inland sections.

Another climatic advantage of the poorer soils over the better ones is the reliability of the rainfall, that is, its relative uniformity from year to year. Such uniformity gives a feeling of security to the peasants and makes them confident that it is worth while to pay for high-class seeds and for the fertilizers necessary for high yields. A last important factor is that in western Europe the farmers can continue their farm work at all seasons, whereas in the black earth region the cold winter, followed by deep mud when the ground thaws, prevents work for four or five months. Even in the Mediterranean lands the long, dry, hot summer, when the crops make little growth, causes the farmers to be comparatively idle. The combined effect of all these various conditions is to make it relatively easy for the peasants of western Europe to accumulate a surplus over and above the immediate needs of food, clothing, and shelter. The eastern peasants on the good black soil, but with few and poor cattle, scanty fertilizers, low yields of crops, long periods of idleness, and frequent crop failures, find it very difficult to accumulate such a surplus. Thus, taking Europe as a whole, the climate appears to have far more effect than the soil upon the yield of crops and the type of agriculture. Locally, indeed, the soil causes most obvious differences, but it is not responsible for the general distribution of agrarian progress.

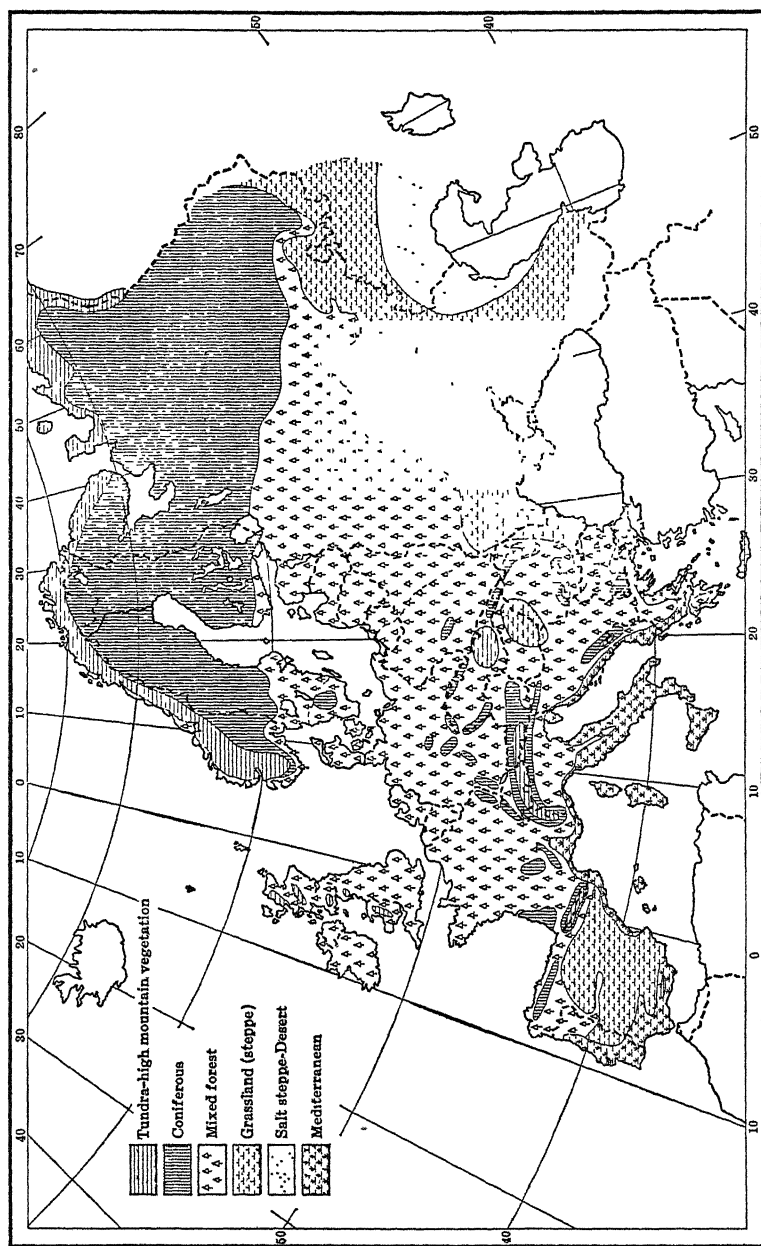
CHAPTER VII

NATURAL VEGETATION

✓ **Characteristics of European Vegetation.**—The natural vegetation of a country depends mainly upon climate and soil. It is so intimately a part of the landscape that one can have no true appreciation of a continent unless he visualizes not only the natural forests and grasslands, but also the artificial forests, the roadside trees and hedges, and other types of vegetation outside the cultivated fields and gardens. A large part of Europe is naturally a region of trees, which form stands of timber that are of value to most European countries, and of outstanding importance to some which find in lumber their principal export. In order to visualize Europe one must take account of the park landscape of the large English properties where the renowned fox hunts are held; the dense, majestic oak and beech forests of central Germany, once the stronghold of the Germanic tribes against the Roman invaders; the uninterrupted northern coniferous forests, where only the white trunks of the intermingled birches relieve the blanket of somber green; the purple heather of Scotland and Scandinavia where the hunter walks waist-deep amid the gorse and the quail fly out from a cover of bushes; the gray-green, gnarled olive trees and cork oaks of the Mediterranean, which often seem as old as the culture of their habitat; and the broad grassy plains of the remote dry region north of the Caspian Sea. All these, and many other landscapes, are a true expression of the regional environment and an essential part of the stage setting not only of Europe's economic life, but also of its art, literature, and history.

✓ The map of natural vegetation (A95) is greatly simplified in comparison with the complex reality. Except under the influence of mountains, the boundaries between the zones of vegetation are rarely defined sharply, but merge into one another through broad transitional belts. Also the mixed forest zone shown on the map combines too many variations to be wholly satisfactory, but a general map calls for simplicity.

✓ **Tundra.**—In the far north and on the higher mountains the tundra and Alpine types of vegetation correspond rather closely to the climatic zone where the average temperature during the warmest months is



A—Vegetation of Europe.

below 10° C. (50° F.). This temperature sets a limit to tree growth. Mosses, grasses, and especially gray lichens form the principal elements of the tundra vegetation, with dwarf bushes and creeping underbrush in the more-favored spots. Food resources are at a minimum, and even in summer the reindeer and dog are the only domestic animals that can find here sufficient sustenance. Swampy land predominates, especially where the slope is not adequate to insure good drainage.

Similar conditions prevail on the European mountains above the forest limit, as shown on the map. In the Alps, the classical example of this type, the Alpine meadows form a continuous belt between the coniferous forests and the eternal snow and ice. After the long snowy period, the short summer brings an outburst of vegetative life of unique coloring. The bright green of the grassy meadows is mingled with the gay hues of brilliant flowers. Plants that are insignificant in the lowlands seem here to have rare beauty and often the most delightful odors. The many Arctic species, a remnant from the Ice Age, make the area a botanical paradise. But in August snow comes once more. Then for nine months a thick white mantle remains unbroken until the late spring when the first crocus pushes its way through the snow and heralds the approaching summer.

Similar conditions prevail lower down in the meadows where the forests have been cut on the upper slopes, although grass is far more abundant than higher up or in true tundra. The cool upland moors of England, Scotland, and Scandinavia are of almost this same type although with far less snow. So wet and dripping are they, with cool mist and rain, that trees cannot thrive, and mosses, lichens, grasses, and little bushes shroud everything in a soggy green mantle.

(Coniferous Forests.)—The region of coniferous forests extends southward from the tundra. A small belt of birches intervenes between the conifers and the tundra, but is too narrow to be shown on the map. The characteristic trees, as the name indicates, are cone-bearers—spruce and pine—intermixed with birch and aspen, and in northeastern Russia also with larch. This European coniferous area is part of a tremendous forest belt circling the Arctic through North America, Europe, and Asia. The Asiatic part is often called by the Siberian name *Taiga*, which may well be used as a general name for the whole belt. Man has invaded the edges of this area for timber, and has wrested from it some croplands for oats, barley, and potatoes. Meadows for dairy cattle have also in some places taken the place of the former trees. Nevertheless, the forest as a whole has scarcely been touched. Even in Europe, where it has been most exploited, it is

still the greatest economic asset of the far north. Here are Europe's great timber resources, which form the chief natural wealth of eastern Norway, Sweden, Finland, and northern Russia. In summer the rivers are filled with millions of trees floating towards the coasts of the Baltic and the White seas. Near the mouths of the rivers mills saw the logs into lumber or transform them into pulp and paper. In contrast to the rest of Europe, the lumber industry here is likely long to remain, as it now is, the dominant economic response to the cool climate.

Coniferous forests also prevail on the higher mountains of central Europe and in the higher Alpine section between the tundra meadows and the mixed forests on the lower slopes. These ancient forests consist mainly of pine, spruce, and larch, but differ in species from those of the north. They still retain considerable importance as a source of timber, although lumbering is overshadowed by other branches of economic activity. Lowland coniferous forests also occupy many detached sandy or rough areas which are not good for agriculture. Chief among these is the belt of moraines and sandy outwash plains extending from northwestern Germany to northern Poland and separated only a little from the main coniferous forest belt. An interesting lowland coniferous forest of another kind has been made artificially, as we saw in an earlier chapter, by forestation of the sand dunes and swamps of the Landes along the shore of the Bay of Biscay.

Mixed Forests.—Between the coniferous forests of the north on the one hand, and the steppes of the east and the Mediterranean type of vegetation in the south on the other hand, extends the largest, most typical zone of European vegetation, the mixed forest as it is called in A95. Its distribution coincides very well with that of the Western and Central European types of climate. Thus it is a product of the Atlantic Ocean. In the more continental climate of eastern Europe it narrows until it practically disappears at the Ural Mountains. In spite of being a response to marine climatic conditions, the mixed forest shows great complexity as a result of local climatic differences, soils, and relief. On the whole, broad-leaved hardwood trees predominate over softwoods, except on the northern border near the coniferous forest and in more sandy soils near the central mountains, as shown in A95. Among the hardwood types, the beech and oak are the most typical, but, while the oak is found throughout the whole region, the beech cannot grow under highly continental climatic conditions, and finds its limit in Sweden and Poland. Other deciduous trees, such as the maple, elm, chestnut, walnut, willow, and poplar,

complete the picture of this forest which once covered most of central Europe. Since then man has compelled the forest to give way to cropland and pasture, and in many places only small patches are left. Nevertheless, most of the uplands of central Europe are still forested, as is a great deal of the sandy glacio-fluvial material in the plains from Holland to Russia. In England some of the forests have been partially left in the form of the park landscape which is so typical of the British Isles. In general, however, the forest has been so much destroyed that in countries like Denmark the percentage of forested land is almost as low as in Ireland where it is 1.4. Even Germany, with its famous forested uplands and up-to-date forestry, has to import part of its timber.

Close to the Atlantic Coast, as we have already seen, excessive moisture, high humidity, and a small supply of sunshine combine with strong winds to prevent the growth of forests. Hence in many places tundra-like moors or bogs, with their sphagnum vegetation, replace the mixed forest, as is common in the British Isles, Holland, and Denmark. But extreme marine conditions, including the absence of a dry season, and mild winter temperatures also favor the perennially green grass which is so essential in the picture of Holland. In warm, wet, selected spots on the coasts of southern Ireland, Cornwall, and Brittany evergreen shrubs reflect a milder type of climate and suggest a transition to the Mediterranean type. In fact along the south coast of Devon and Cornwall in southwestern England a narrow strip is so warm that it is sometimes called the English Riviera, and is used for raising early vegetables.

The Mediterranean Region.—This region corresponds closely to that of the Mediterranean climate. Its vegetation is a response to mild, rainy winters and hot, dry summers. The forest bears small-leaved, leathery, evergreen foliage, and its characteristic species include cork oaks, laurels, pines, cypresses, cedars, and especially gray-leaved olive trees which are the most common tree although not now found wild to any appreciable extent. The present trees of these kinds were planted by man, but originally wild trees covered thousands of acres in the Mediterranean region. In places where the forest has been destroyed, a dense scrub—the so-called maquis—may prevail. It is a mixture of evergreen and deciduous plants, beautiful in spring when the rains bring forth innumerable flowers, but brown and lifeless during the unrelieved summer drought. On the higher slopes and in the less dry northern part, the chestnut becomes the dominating tree, while beech forests form a still higher extension of the central European hardwoods. Continuous cutting on the part of a fairly

dense population has destroyed most of the good timber of the Mediterranean forests and has aggravated the erosion of the soil on the slopes, which is one of the great evils in this region. Hence at present the Mediterranean countries have to rely mainly on imported timber, except where the original forest cover is left in the remote mountains.

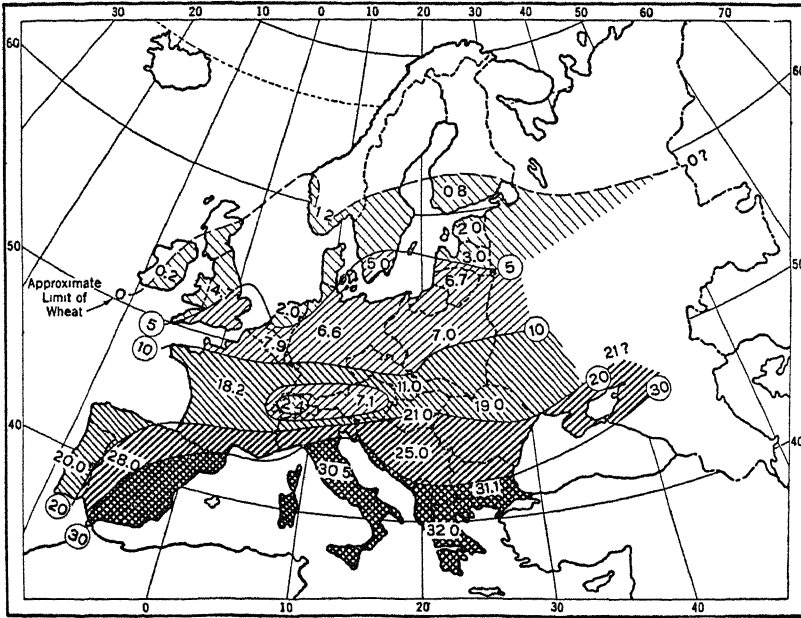
One of the most delightful features of the Mediterranean vegetation is the marvelous display of flowers in the spring. During April in Greece, for example, the ground under the olive trees is often completely carpeted with deep red poppies. A bare slope close by may be yellow with mustard and buttercups, while other flowers, blue and purple, form great patches elsewhere. In the moister valleys the forested slopes may be dotted with the purplish pink of flowering Judas trees, the yellow of locusts, and the white of other blossoming trees. The Mediterranean countries do not have any more flowers than others, perhaps not so many, but the flowers all have to bloom at almost the same time during the short, delightful spring between the cool winter and the dry summer.

Steppe.—Wherever the precipitation becomes too low for trees, steppe vegetation, with its tufts of grass, sets in. The transition is very gradual and irregular. Often a transitional park zone can be recognized; in Russia, for instance, the dividing line between the steppe and the forests is very sinuous. The steppe vegetation is at its best in spring when the flowers of many perennial bulbs and tubers make the plains look like a colorful carpet. With the hot dry mid-summer this vanishes; even the grasses lose their green color and the steppe looks yellowish brown under the scorching sun.

We have already seen that the great steppe areas with their waving grasses have lost most of their former vegetation, for man long ago discovered not only the fertility of the soil, but also the ease with which cereals can be grown in it. Enormous fields of wheat cover the region where once the Tartars wandered with their herds and flocks. Of the Hungarian Puszta only a small part is left as natural grassland; the rest has been brought under cultivation. In the same way the Spanish steppe with its esparto grass and roaming herds of merino sheep sees the invasion of agriculture based on dry farming. Only in the drier steppes does stock-raising still prevail, for instance north of the Crimean Mountains and farther east where dryness and salinity are associated with the salt shrub vegetation of the Caspian Desert.

There is a curious parallelism between vegetation and human progress. Tundras, coniferous forests, mixed forests, Mediterranean regions, and steppes all have certain possibilities but these vary

enormously. The mixed forest offers far the greatest choice to human ingenuity. There, and there alone, does one find an abundance of good softwoods, good hardwoods, and good grass. And there too one finds the best crops and the highest human development. This combination of many favorable factors in one region is one of the chief reasons for the dominance of Europe.



A—Percentage of Harvested Land Devoted to Wheat in Europe.

CHAPTER VIII

LAND UTILIZATION: AGRICULTURE

Fundamental Importance of Agriculture.—In practically all countries vastly more land is used for agriculture than for all other purposes combined. Only in highly industrialized regions are the persons who make a living in agricultural pursuits less numerous than those in non-agricultural pursuits. In Europe as a whole, agriculture continues to be the principal economic enterprise, even in these days of industrialization. Omitting Russia, 39 per cent of all the men in Europe are engaged in agriculture; including Russia the percentage rises to 51. This is the more astonishing when we remember that the other occupations include mining, manufacturing, the building industries, transportation, government employment, personal and domestic service, and the professions. These figures make it clear that the farm population furnishes the greatest single market for non-agricultural products. Even in the highly industrialized countries of western Europe (Europe A), where the number of farmers seems negligible, the farming population forms 25 per cent of the total, as appears in the following table:

	Approximate Percentage of Total Population of Europe	Approximate Percentage of Population Dependent on Agriculture
Europe A	33	25
Europe B	17	50
Europe C, Southern Part .	17	60
Europe C, Eastern Part ..	33	75

Even in Europe A the agricultural situation serves as a kind of barometer of prosperity. In Europe B this is still more true, while in Europe C the importance of farming transcends that of all other occupations combined. In eastern Europe where at least 75 per cent of the population depend on farming for a living it is very obvious that agriculture is the basis of any general prosperity, but even in western Europe this is also true. Among the burning problems of Europe, few are more important than the widespread depression among the farmers. The solution of this would go far toward releasing Europe from an ever-threatening situation.

Factors Controlling Land Utilization.—The agricultural use of the land depends upon three sets of factors: geographic, economic, and cultural. The main geographical factors, temperature, rainfall, soil, and relief, have been discussed so fully in previous chapters that little need be said about them here. Their importance lies mainly in their relation to the growth of plants and animals, but their effect on transportation and on the density and character of the non-agricultural as well as the agricultural population must not be overlooked. The economic factors are closely connected with the geographic. They center around the problem of costs and profits. Therefore transportation, the number, density, and purchasing power of the non-agricultural population, and hence the size of the market that can profitably be supplied from a given area are very important. So, too, is the extent to which a crop may be excluded from a region because it does not pay, even though it grows admirably. Finally the cultural factors include the stage of agricultural and industrial development, the local standards and prejudices, the system of land tenure, and such governmental matters as tariffs and subsidies. People in a relatively simple stage of agriculture, such as prevails in northern Poland, raise flax because they depend largely on their own products for clothing. People in a higher stage in England raise no flax because it pays better to import it, even though England might raise twice as much per acre as northern Poland. Turkey is devoid of swine not because they cannot be raised, but because of its Moslem population. People who own their farms plant apple orchards in regions where the tenant with short and insecure tenure does not think them worth while.

Types of Land Utilization.—The combined influence of geographic, economic, and cultural factors leads to well-defined types of land utilization. Some regions, such as Belgium, are naturally adapted to any or all of these, and land utilization has there evolved through many stages until it is now at the highest level. In others only the most simple types of utilization are feasible. Hunting, for example, is a practicable method of using the land in almost every region where there is vegetation. It persists as an important method only in areas like northeastern Russia, too cool, wet, or otherwise unfavorable to permit other uses. Lumbering was originally feasible in practically all parts of Europe where trees grow in compact stands. It now persists mainly where climate, soil, and relief make agriculture unprofitable. Stock-raising of the extensive kind, where the flocks and herds wander widely, is a practicable mode of land utilization wherever grass is available, but today it persists mainly in dry, rugged, or cool areas like southeastern Russia, the Yugoslavian and Spanish mountains, and

the cool pastures where the Lapps herd their reindeer. Elsewhere it has been pushed out, chiefly by the extensive type of agriculture in which the main reliance is upon field crops like wheat and rye which are planted over wide areas and not given much cultivation. Notice how this type of land utilization (6 in Count Teleki's map, A19) surrounds other types, and is itself surrounded by the more primitive type of extensive stock-raising.

Where the geographic conditions are more favorable the extensive type of agriculture usually gives place to moderately intensive farming, in which the farmers raise mainly cereals. They also grow some vegetables, fruits, and industrial plants such as flax, but do not cultivate or fertilize with great care. They raise a few barnyard cattle and other animals, but only enough, as a rule, to supply their own needs. Nearer the North Sea, where the geographic conditions are still more favorable, the stage of culture is almost certain to rise even higher. Hence we find one of the four intensive types of utilization shown in A19. One of these is ordinary intensive agriculture where crops of considerable variety are raised with careful cultivation and abundant fertilization. This is the dominant type in most of western Europe (2 in A19). In this, as in the preceding types, the farmers may raise products for sale, but the main purpose is to supply their families. The same is true of the Mediterranean type of intensive land utilization (7 in A19) where olives, grapes, and wheat are the chief reliance. Where dairying (3 in A19) and market gardening, or horticulture (1 in A19) prevail, however, the degree of specialization is so great that the farmer must sell most of his product. Hence areas of these types appear in A19 mainly as scattered spots in the midst of the more common and varied types of intensive agriculture.

The facts that have just been stated indicate that the people in the most-favored parts of Europe are free to choose among a great number of possible types of land utilization. Elsewhere the choice becomes more and more limited and the higher types more and more difficult until we come to regions where only the simplest is feasible. Thus around London, Paris, or Berlin hunting, lumbering, stock-raising, extensive agriculture, the medium type of agriculture, the ordinary intensive type, dairying, and market gardening are all possible, or at least would be possible if economic considerations did not cause higher types to exclude the lower ones. On the other hand, in the outer or less-favored parts of Europe C only one or two of these possibilities is practicable.

How Farming Became a Business.—The history of agriculture in Europe illustrates how man has chosen among the various possibilities and has progressed

from one type of land utilization to another. It shows two great tendencies. One is the spread of intensive agriculture from the borders of the Mediterranean northwestward to the North Sea region. The other is the change from the purely sustenance type of farming in which the farmer merely supplies his own needs to the commercial kind in which he raises very little for his own use and sells practically everything.

Ancient and Medieval Agriculture.—In ancient times practically every man was a farmer—either a peasant worker or a landowner. The task of each small community was simply to raise enough food and clothing material for immediate local needs. The technique of preserving food was poorly developed, and trade was negligible except for a little barter. If the peasant produced more than he or his neighbors could use, the surplus was mostly wasted. If he did not produce enough, he faced starvation. The methods of cultivation were crude, and most of the agriculture was confined to the cultivation of wheat and barley in the extensive fashion. Even this was largely limited to the regions with the Mediterranean type of climate. Nevertheless, when Athens, Carthage, and Rome grew great, some overseas trade in grain arose, and Sicily and Spain became granaries for the larger cities. Moreover, near the cities, but not in the remoter districts, the raising of grapes, olives, and a few vegetables began to take on a somewhat intensive and commercial character.

Even as late as the end of the Middle Ages, however, the general system of agriculture had not changed greatly, and there was practically no overseas trade and no transportation of food for more than a few miles. At least part of the land, to be sure, had been brought under cultivation in most of the sections where agriculture now prevails. Nevertheless, most of the cultivation was extensive, fertilizers were little used, yields were small, and so was the cultivated area per man. Naturally there was dire poverty everywhere, according to our standards, and the differences between one part of the continent and another were far less than now. Since practically every part of the continent had to grow its own food, the density of the population in any given section was determined largely by the productivity of the soil. The productivity averaged low not only for the reasons just stated, but because devastating wars were frequent, and the system of land tenure was a handicap. In some sections like Russia the land system was of the community type, in which small plots were rotated year by year among the villagers, no one of whom felt any responsibility for improvement of the soil which another might till the following season. Elsewhere, as in France, the manorial system prevailed, the peasants being little more than serfs. The land might belong either to the nobility or the church, but neither the lords of the manors nor the clergy had much personal interest in improving the methods of farming.

Agriculture, at this stage, was simply a means of self-sustenance. It offered a livelihood, but no opportunity for profit and the accumulation of a surplus, at least among the peasants. There was little inducement to increased labor and greater productiveness until some change apart from agriculture gave rise to an increased population, and so provided purchasers for surplus foodstuffs.

The Beginning of a Change.—Symptoms of such a change appeared in Flanders during the latter part of the Middle Ages. There in the very heart of the progressive North Sea region, the textile industries, especially the woolen industry, made rapid strides. Perhaps this was partly because the same energy which promoted the textile industry also caused agricultural development. At any rate

the presence of textile workers who had to buy food encouraged the farmers to increase their production in spite of poor soils. Nowhere else in Europe, even at present, is the utilization of inferior land so highly developed as in Flanders. Later the wonderful polder regions of Holland, once covered by lakes and seas, were actively reclaimed because the advantages of fishing and the coastal trade had led to a marked growth of population, and the land must be made to feed them. A similar reaction of one mode of life upon another took place in other parts of western Europe. The grim rocky coast of Norway, for example, would never have been so well populated, nor its narrow valleys so thoroughly cultivated, had not the warm coastal waters been full of fish which were easy to take because numerous islands protect the coast from western storms.

Here, then, are the beginnings of great changes involving the interdependence of agriculture and other pursuits. They originated in the general region from which most of the steps of recent European progress have started and spread outward. Other industries would never have been possible unless the farmers were ready to produce food beyond their own requirements. And the farmers, but for this mutual relationship, would have enjoyed no goods except those of their own production. Nevertheless, a century and a half ago most of the farmers of Europe were still restricted to a life of narrow self-sufficiency; only those living in exceptionally fortunate localities had occasion to grow surplus products and an opportunity to sell them. This is still largely the situation in the great sections of Europe where the utilization of the land does not yet show the commercial specialization which appears in the parts of A19 showing dairying and market gardening. Even in the regions of ordinary intensive agriculture the farmer merely sells his surplus but tries as far as possible to be self-supporting. In eastern Europe the sale of such a surplus is often negligible, especially in times of poor crops or low prices. Thus the peasants are still practically in the stage of mere self-sustenance, although Russia has introduced a wholly new system.

Revolutionary Changes.—Toward the end of the eighteenth century the French Revolution brought an enormous change in the agricultural structure of western Europe. This marks the approximate date of the emergence of the tillers of the soil from a long vassalage, and the first realization of their desire for actual ownership of the land. From this point of view the French Revolution is not the outbreak of a sudden protest, but the final definite blow after centuries of struggle by the peasants to free themselves from the bonds of dependency. In England, at about the same time, a corresponding change took place gradually. Here, however, in contrast to the French idea of small private properties, the larger holdings actually increased in significance, because of the outflow of labor from the land to the rapidly growing industrial cities. The English farmer is still in most cases a tenant. His gain lies in the fact that in general his tenure is relatively long and he is his own master. The change from actual slavery to freedom came later and much more gradually in eastern Europe. There, even after the abolition of serfdom, the big properties continued to exist in most countries until agrarian reforms after the World War made the peasants proprietors of their own small holdings.

While this change in land tenure was going on, another change introduced a still further contrast between the progressive west and the more slowly changing east and south. This was the increasing industrialization of western Europe which created an ever-growing demand for food. The farmer, in turn, seeing

the advantage of a large surplus and of raising expensive products rather than merely grain, was driven to greater activity. He was also obliged to adopt more efficient methods because the new factories attracted many country lads to the towns, and farm labor became correspondingly scarce.

During this same period the agriculture of western Europe was encouraged by the invention of improved implements and the inauguration of scientific systems of tillage, but these were little used in the east and south. The western farmers began to use fertilizers to restore the productivity of soil that had suffered exhaustion for centuries and to increase the fecundity of newly used land. The value of the rotation of crops was scientifically demonstrated and new practices in this respect spread widely. Millions of previously unused acres were put under cultivation. The yield per acre increased astonishingly in the west although changing but little in regions like Spain, Sicily, Greece, and eastern Russia. In Germany, for instance, agricultural productivity, combining crops and stock-raising, increased 212 per cent in a hundred years, the result partly of increased arable land, but chiefly of increased agricultural intensity. During the same period the wages of agricultural labor increased twelvefold in money although much less in real value. Even in Europe C, to refer again to our three cultural zones, there was some progress in the adjustment of farming to the limitations and advantages of geographical environment. Almost everywhere cheaper and faster transportation made it possible to sell a surplus or buy necessary supplies in a great variety of markets, but here again the great change was in the west.

It is interesting to note that whereas in the west this new stimulus to agriculture affected the free farmers as well as the landlords and owners of big estates, in the east it chiefly influenced the estates and scarcely touched the peasants. The large property owners awakened to the responsibility of agricultural leadership and undertook to reorganize their estates according to progressive standards. Thus the payment of better wages to farm laborers, the use of fertilizers, and the increasing employment of machinery made many of the large eastern holdings more profitable than the small, independent properties of western Europe. The great estates of eastern Europe became the source of grain to supply the growing demand in the west. In Germany east of the Elbe and in the old Austro-Hungarian Empire the activity of the large landowners was especially significant. The Prussian and Hungarian noblemen did not, to be sure, show much respect for their farm laborers, who in most cases were of a different nationality like the Poles in Prussia and the Rumanians and South Slavs in Hungary, but they were very familiar with the principles of modern agrarian organization. Even in Russia an awakening of interest in agrarian problems was perceptible. Only in the Baltic districts, however, which belong in Europe B both culturally and climatically, was much accomplished before the Russian revolution put a complete stop to large private ownership. There the Baltic barons showed their inheritance of German efficiency. In a minor way Poland showed the same thing, but even today one can see there an extraordinary contrast between the efficiency of the large landowners and the peasants. The authors have seen rows of strong, sturdy potatoes, promising big tubers and a good yield per acre growing side by side with rows of spindling, weak plants, promising small tubers and a low yield. The good ones belonged to the baron, the poor to his men for whom he provided plots of ground for their own use. The same seed potatoes, the same soil, and almost the same fertilizer were used

in both cases. The main difference was that the peasants insisted on planting their potatoes close together year after year for the alleged purpose of increasing the yield. They did this even though they saw that the landowner got better potatoes and a larger yield per acre.

Progress in southern Europe was even slower than in the east, owing partly to deplorable political upheavals, but perhaps still more to the tendency of the population to dream about their ancient glory rather than struggle with contemporary facts in the face of a climate that invites ease and leisure. These conditions were parts of the same general situation which has held back not only agriculture, but progress in general in Europe C. Thus the different parts of Europe varied in their response to the new ideas that brought about the agricultural revolution. Nevertheless, practically the whole continent has now emerged from the period of local self-sufficiency and has entered a new era of wider relationships.

Problems and Handicaps.—Ever since the agricultural revolution of a century ago the rising tide of progress has been subject to a variety of depressive problems. One, already mentioned, was the scarcity of farm labor due to the attractions of industrial wages and a more varied life in the towns. This led to considerable depopulation in some of the English rural districts. In general, however, this problem arose gradually, and was met in part by a seasonal migration of labor from other parts of the continent at harvest time. Laborers from northern Italy still move into France every summer; Germans once migrated into Holland when the hay had to be cut, and eastern Germany has long been puzzled as to what to do about the infiltration of Poles. In general the movement is from the less active to the more active countries.

A much more serious problem arose when improved facilities of transportation permitted the sudden increase of competition from other parts of the world. This was first felt just after the Napoleonic period, which had been the initial era of prosperity for the western European farmer. A great agricultural depression then ensued, culminating in 1823. In the main it was due to a surplus of grain on the European market. With the help of wells, used but little hitherto, colonization had been pushed in southern Russia on the grassy plains of the fertile Black Soil Belt where once the Tartars had wandered. Improvements in wagon transportation and in the use of rivers permitted the export of vast quantities of grain through the Black Sea harbors. This disorganized the markets of western Europe so badly that in Holland, for instance, the price of wheat fell 83 per cent, and farmers were brought to the brink of ruin. The conditions resembled those after the World War when a golden period of high prices for the farmers was replaced by rivalry with the increased production of the whole world.

During the depression in the early part of the last century several countries tried to improve conditions by imposing import duties on grain, a remedy which was already old, and which was as little effective then as it is today. In England this resulted in a further decrease of small freeholds and an increase in large estate. At the same time agrarian co-operatives, protecting their members by financial support, became gradually an important factor in the agriculture of Europe. Here, too, the lead was taken by a North Sea country, Denmark, whose achievements have become a model for all the world.

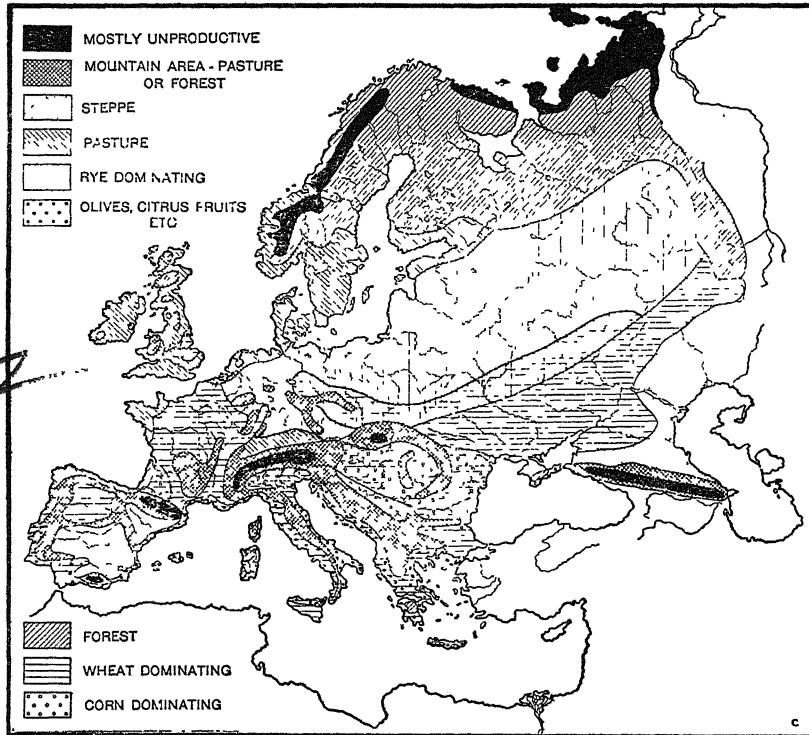
The Results of Nineteenth-Century Changes.—During the remainder of the nineteenth century, and in the present century, in spite of various interruptions the tendency toward specialization in the west and toward a greater contrast

between Europe A and Europe C has continued. One important factor has been the development not only of new lands beyond the ocean but also of efficient agricultural machinery there and of cheap and easy transportation. Although the wheat regions of the United States, Canada, and Australia have such dry climates that they cannot raise much wheat per acre, they have good soils, and plenty of land in comparison with the population. Hence they are cultivated on a huge scale by means of big machines. Production is so easy that foreign grain can be delivered in Europe very cheaply. In view of this the farmers of the North Sea countries turned still more to the raising of vegetables, fruit, and poultry, and especially to dairying.

Western Europe with its mild humid climate and open winters is very well suited to dairying. This form of agriculture, however, requires less manpower than does intensive crop-raising, and when it was introduced many farmers had to seek new forms of employment. In England the adjustment was comparatively easy because the large landholders were financially strong enough to face the costly period of readjustment, and the growing demand for workers in the industrial centers absorbed those who could no longer find employment on the farms. Holland and Denmark also weathered the change, largely because of co-operative systems developed by the farmers, particularly in Denmark. Holland was aided by its accumulation of national wealth through a long period of prosperity in trade, and by the growing demand for dairy products, vegetables, and fruit in the adjacent industrial regions of Germany, England, and Belgium. Successful adjustment was not everywhere possible, however, as will be illustrated later in the chapter on Ireland.

Present Status of Land Utilization.—Arrangement of Crops. (The agricultural revolution of the eighteenth and nineteenth centuries and the introduction of food from across the sea have introduced a new arrangement of crops in Europe.) Before 1800 the crops were arranged very closely in harmony with the soil and climate. In other words, the crops raised in each region were those which grew best there, and thus furnished the most food with the least work and the least uncertainty. Accordingly the various types of crops were arranged in broad zones stretching from southwest to northeast as in A109. This simple pattern was altered a little, but not much, by the efforts of each country to grow within its own borders the entire variety of agricultural products which it required. The new régime of industrialization and overseas competition altered all this in western Europe, and sometimes changed the zones beyond recognition. The farmers in many sections no longer raised the crops best adapted to the soil and climate, but those whose bulk, perishable nature, or high value made them best able to compete with products from across the seas. This meant, of course, a still further intensification of agriculture in the regions near dense industrial populations. Hence roughly circular zones became established around the industrial centers. The immediate urban fringes were devoted to market gardening,

dairying, and other forms of intensive agriculture, and the outlying rings to extensive agriculture, stock ranges, and forests. Some of the small countries like Holland and Denmark shifted almost entirely from subsistence crops to dairying and truck farming. They sold their products in the rapidly developing urban markets of the nearby industrial regions of England and Germany. Where the industrial centers were fairly close together, the zones often conflicted and overlapped, with the result that stock ranges and forest areas were



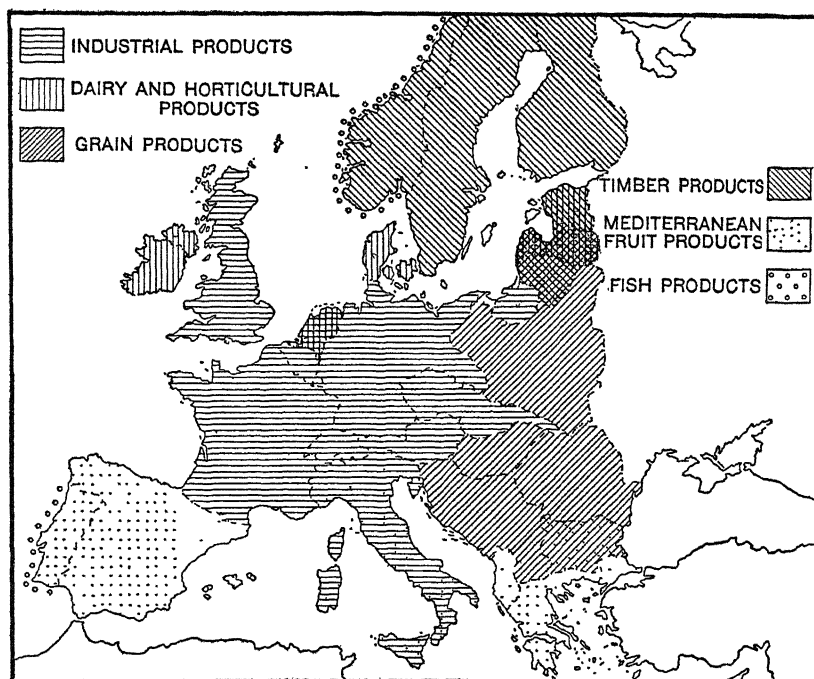
A—Land Utilization in Europe.

largely relegated to the more remote and rural regions and especially to Zones B and C in our cultural map of the continent. This change in the general distribution of agriculture is illustrated by the contrast between A109 with its strips and A115 with its concentric arrangement around the North Sea.

The latest phase of the development of the use of the land in Europe has been the spread of western methods into Zones B and C. This has taken two diverse forms, Russian and non-Russian. The

Russian method has been to take the co-operative methods of a country like Denmark and the machines of the industrial countries and try to force them upon the peasants. Thus far this has not greatly increased the total agricultural production of Russia, and it is not yet clear what its ultimate effect will be.

The other method is preeminently that of the parts of Zone B which once belonged to Russia or to the old Austro-Hungarian Empire. These are the countries where grain products predominate in A110, together with the Baltic States with their mixed products farther north.



A—Types of Major Productivity in Europe, by Countries.

Under the influence of the Russian revolution, and in fear that agrarian discontent would cause it to spread into their countries, most of the new countries from Yugoslavia to Esthonia began to cut up the great landed estates of the nobility into small holdings to be owned by free peasants. This has introduced a far-reaching change, in particular because the conservative policy of the landlords had been for years perhaps the most stable and economically profitable feature of those countries. The various methods in which this reform found expression are described in later chapters.

The economic consequences of this great change in land ownership are not yet clear. The initial difficulties were great. The new owners lacked the economic outlook of their former landlords. They also lacked capital to buy implements or provide for bad years. Co-operative societies could not be immediately arranged, and the new governments were financially unstable and could not provide the necessary capital. The same is true of agricultural schools which are needed to give the new farming generation the necessary background for a better agrarian development. But even if all these conditions were favorable it is still an open question whether the financially powerful landlord was not better fitted to face the dangers of an unreliable climate than is the free farmer on his small property which is barely large enough to provide him a living.

Agricultural Regions.—Count Teleki's map (A109) has already given us a clear idea of the intensity and type of agriculture in the various areas, but here we want to concentrate on the distribution of products. A109 shows that south of the northern zone of forests, and unproductive tundra and high mountains, dairying is the main agricultural pursuit in a belt extending from Ireland, northern Spain and Brittany into Russia. Its location here is largely the result of summers so cool that grass, oats, and cattle thrive better than other agricultural products.

Although dairying gives unity, each country in this belt has its own distinctive products. Even in Ireland, which depends to an unusual degree on cattle, the cultivation of oats and potatoes is well developed. In Great Britain the upland moors and limestone downs provide grassy pastures for larger herds of wandering sheep than are found in any other country of Europe. In the drier east, fields of wheat and barley are almost as extensive as those of oats, although the latter are far more abundant in the more humid, greener west. Holland is considered a country of vegetables, fruits, flowers, and nursery trees even though these do not occupy one fifth as much space as grassland. Denmark is known for its intensive cultivation of fodder crops—vast quantities of oats and clover which are fed green to the cattle. Flax, with its sky-blue little blossoms, is conspicuous in the Baltic States, although the area which it occupies is small. In Germany the land slopes upward toward the south in such a way that the plateaus of Switzerland and Bavaria at the northern base of the Alps form an outlier of the dairy belt.

South and especially east of the dairying region rye becomes the outstanding crop, and upon it depends the life of millions of persons from eastern Belgium through Holland, Germany, and Poland into

Russia. A continental type of climate with warm summers here permits cereals to replace grass; but poor soils and unfavorable climatic conditions make this section less suitable for wheat. The wheat belt lies south of the rye belt, but overlaps it considerably. On the west it begins in the Spanish Plateau. Most of France falls in this belt not only because of the relatively high summer temperatures, but also because of the protective system of the French government, which favors the use of home-grown wheat. The French eat wheat bread more universally and abundantly than practically any other nation. Farther east the wheat belt crosses southern Germany to Austria, but wheat and rye as well as other crops like sugar beets are much mixed here. The wheat belt is developed with special clearness in a huge area in southern Russia between the rye region and the dry steppes with their cattle.

The combination of wheat and corn which A109 shows in southwestern France is typical of an extensive zone between the Western and Central European types of climate, on the one hand, and the Mediterranean type on the other. In the latter the scarcity of summer rain prevents the growth of corn. The part of Europe where this crop grows best has its heaviest rain as a rule in spring and fall. This includes northern Portugal, southern France, and northern Italy, and extends also into the Danube Basin, Yugoslavia, and the plains of Rumania. This corn belt has no such individuality as that of the United States, and nowhere does corn become such a predominant feature in agriculture. One thing that prevents the existence of a corn belt like that of America is the occurrence of a great system of mountains in southern and central Europe in just the zone best fitted for corn.

All along the southern coasts of Europe there prevails what is called the Mediterranean type of agriculture, characterized by wheat as the main crop and olives and grapes as its two chief subsidiaries. The wheat is harvested in early summer, the grapes in the early fall, and the olives still later. In the drier sections irrigation becomes all-important, and in many places lemons, oranges, figs, and other fruits are raised. The irrigated fruit gardens of the Spanish coast are typically subtropical, being suited to dates, sugar cane, and cotton. In spite of the importance of the more distinctively Mediterranean crops, the percentage of the cultivated land devoted to wheat here reaches a maximum (A100).

In much of the Spanish Upland, or Meseta, in parts of Sicily and Greece, and especially in southeastern Russia the climate is so dry that sheep-raising becomes the dominant occupation, and there are

also many goats. It is curious that the cool humidity of the Scotch moors and the hot aridity of the Caspian region should both lead to the use of sheep. In the humid regions the shepherds do not have to be migratory—to practice the kind of seasonal migration known as transhumance—because the grass constantly renews itself. In the dry regions the grass does not renew itself after the rains become scanty, and therefore the flocks must be driven to fresh pastures in the mountains or elsewhere.

Europe's Agricultural Balance.—Having seen where Europe's crops are raised we may well ask how far the continent supplies its own needs. On the whole the cereal production of Europe, in spite of its high total, shows a serious deficit. Even oats and rye do not supply the European demand. The location of this deficit in comparison with the areas where there is a surplus is surprising. The countries of southeastern Europe, where the production is low per acre and the acreage per family small, are the only ones with a surplus. This is possible only because the people there live on a low standard compared with that of Europe as a whole, raise little except grain, consume very little themselves, and have no large urban and industrial population of their own to supply. The western countries, on the other hand, as we have seen, find that it pays better to raise dairy products, vegetables, fruits, and other high-priced commodities, and therefore give relatively little space to grain. In Rumania 75 per cent of all the cropped land is in cereals; in Great Britain, only 31 per cent.

The situation with respect to surplus and deficit changes from year to year. Sometimes large grain-producing countries have a surplus which they have difficulty in selling—rye and oats, for instance, in Germany, and rye in Poland. With respect to corn in Hungary and barley in Rumania the situation is much the same. On the whole, southeastern Europe has a surplus of each of these crops, whereas the rest of Europe has a tremendous deficit, although France, which sometimes exports wheat in years of high production, may be an exception. Nevertheless, southeastern Europe often has great difficulty in selling its surplus because it has to compete with overseas grain-producers.

With respect to sugar beets it would seem as if the European situation should be better. Central Europe, from Belgium to Czechoslovakia, Poland, and south central Russia, has a surplus large enough to provide for all of Europe, with the exception of Great Britain, which is Europe's greatest sugar-consumer. But sharp competition from countries that produce cane sugar, especially Cuba and Java,

often causes overproduction and makes this branch of crop production unprofitable too.

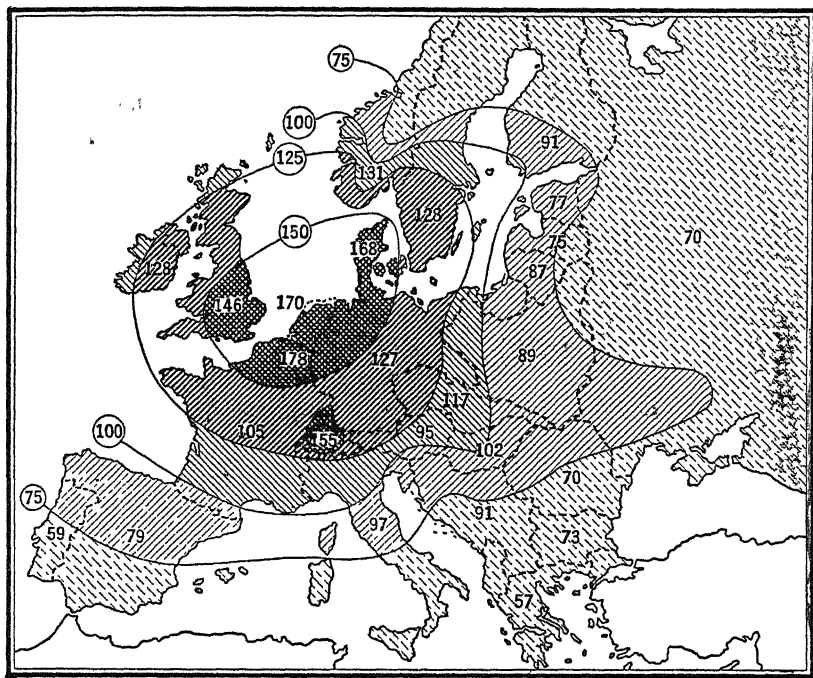
Dairying provides a surplus of milk, butter, and cheese in the countries of western Europe from northern France and Switzerland to Denmark and the Baltic Sea. Great Britain, however, because of its large industrial population, faces a great deficit. In southeastern Europe dairy products are still insignificant. As for meat, there is a surplus not only in some of the stock-raising countries like Ireland, Holland, and Denmark, but also in some of the crop-raising countries of eastern Europe, like Poland, Hungary, Yugoslavia, and Rumania. This is mostly in the form of pork. Like the surplus of cereals in eastern Europe it arises more from underconsumption in the producing areas than from a great abundance of animals.

On the whole, Europe faces a rather large deficit in food, with few countries producing a surplus, and many with deficits. The latter are often unable to increase their production enough to compete successfully with the oversea sources. The combination of a deficit of this sort with very unfavorable agrarian conditions is one of the strange paradoxes of the world's present economic situation. It has frequently been true of late that an agrarian population facing starvation prays for bad crops in order to lower the general surplus, thus raising prices and giving the farmers a chance to sell something. The great trouble lies in the problem of distribution, middlemen, and trade, and not in production, for Europe, and still more the world as a whole, always need more than they produce.

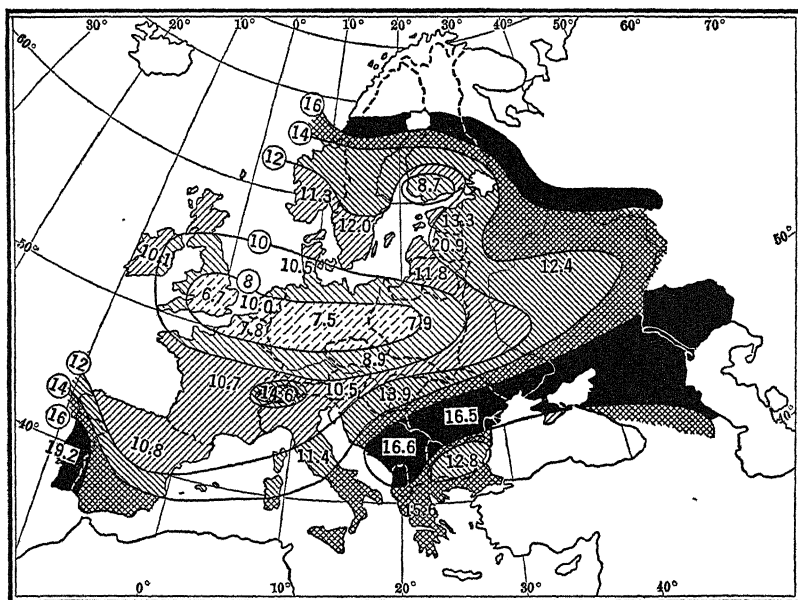
Productivity per Acre.—In the long run the kind of crops that people raise is far less important than the yield of the crops per acre. The hay on an acre of land is worth only a fraction as much as the tobacco. Nevertheless, the farmer who cuts twice as much as the average amount of hay per acre is likely to become well-to-do, whereas the one who strips only half of the average amount of tobacco per acre will probably always remain poor. We have already seen that the yield of crops around the North Sea is greater per acre than anywhere else in Europe, or in the whole world for that matter. In many cases the quality is also better. The extraordinary feature of this is that it applies to practically all crops. Even those like grapes, corn, olives, and cotton, which will not grow in the marine climate of that region generally show the largest yield in the portion of their habitat where the climate approaches most-nearly to the North Sea type.

The differences which thus arise are remarkable not only for their magnitude, but also because the situation seen in Europe is faithfully

repeated under corresponding conditions in the other continents. A115 sums up the whole matter for Europe. It shows the productivity of the land per acre on the basis of eight very widely raised crops, namely wheat, rye, barley, oats, corn, potatoes, sugar beets, and hay. For each crop the yield per acre for Europe as a whole is called 100, and the yield in each country is calculated accordingly. It is possible that, if data were available for grapes and olives, the position of the Mediterranean countries might be a little improved, but the change would be insignificant. The outstanding fact is that Holland and



prosperity from one region to another the reliability of the crops is of great importance. A farmer who gets 24 bushels of wheat per acre one year, then 15, and the third year 9, averages 16, but he is not nearly so well off as the one with the same average who gets 18, 16, and 14 bushels per acre in three successive years. The first never knows how well off he is going to be. One year he feels rich and spends extravagantly, or more likely pays up old debts, but the third year he does not even get a living and runs badly into debt. The other knows what to expect, lives on about the same scale all the time, and can save a little each year.



A—Variability of Crops, Expressed as Average Percentage of Departure from Normal, 1927-33.

Such a difference is what A116 shows between Europe A and Europe C. A small figure means high reliability, that is, only a little variation in the yield of crops per acre from year to year. The map shows the percentage of deviation from the average yield (1927-33) on the basis of the weighted acreage and value of wheat, oats, rye, barley, corn, potatoes, grapes, and flax. A low figure means little variation, a high figure a great deal. For any individual crop the variation is far greater than for many crops combined. Moreover, 1927-33 were not years of extreme variability. The figure for Spain is probably too low because the statistics there are unreliable and because northern and southern Spain have such different climates that good crops in one

region often cancel bad ones in the other. The same sort of balance between the north and south lowers the Italian percentage. Irrigated regions, however, such as the southern parts of Spain, Italy, and Greece do not suffer from the unreliability of the crops so much as do the more continental regions farther north. Rumania in Europe C, with a variation of 16 per cent, presents conditions which entail low standards of living if the agricultural population is dense. Of course the low standards of tillage intensify agricultural difficulties, and the degree of variation in Europe A would doubtless be greater if the people there used no better methods than those of Europe C. Nevertheless, the continental climate is the main factor in causing the unreliability of the crops. Russia is so huge that good crops in the wheat region, for example, often cancel bad ones in the rye region. If data for the individual climatic regions were available separately, we should undoubtedly find that in northern Russia the conditions are worse than those of the Baltic states, and in southern or southeastern Russia they are worse than those of Rumania. In the Caspian region the variability of the crops is so intense that famines are common. Far away to the east in China the continentality of the rainfall reaches its maximum and the famines are the worst in the world. The core of low variability from England to Poland is noteworthy.

Cultivated Land per Family.—The amount of land cultivated by the average farmer's family must also be considered before we can fully understand the difference in the utilization of the land in various parts of Europe. Practically all the countries of Europe publish statistics of the number of acres devoted to crops each year. They also publish statistics of actual population dependent upon the farms for support, or at least of the number of men and women at work on the farms, and to this we can add the children and the women who are not classified as farm workers. In estimating the cultivated land we include every acre from which a crop is harvested, no matter whether the crop is sown each year or only at long intervals, as in hayfields, vineyards, and orchards. The result may be expressed in terms of the number of acres actually cultivated per farm family of 5 persons in each country. Here, as in so many other cases, we have the usual superiority of the North Sea region where the dairying sections with their abundant grasslands have over 24 acres per family. Toward the south this falls off rapidly until it becomes only about 6 in southern Spain and Greece. Eastward it is noticeable that the Baltic countries, especially Estonia, rank high, mainly because they raise a great deal of hay. Nevertheless, Poland and Russia drop to an average of only 14, and Bulgaria to 12, while large sections of Russia

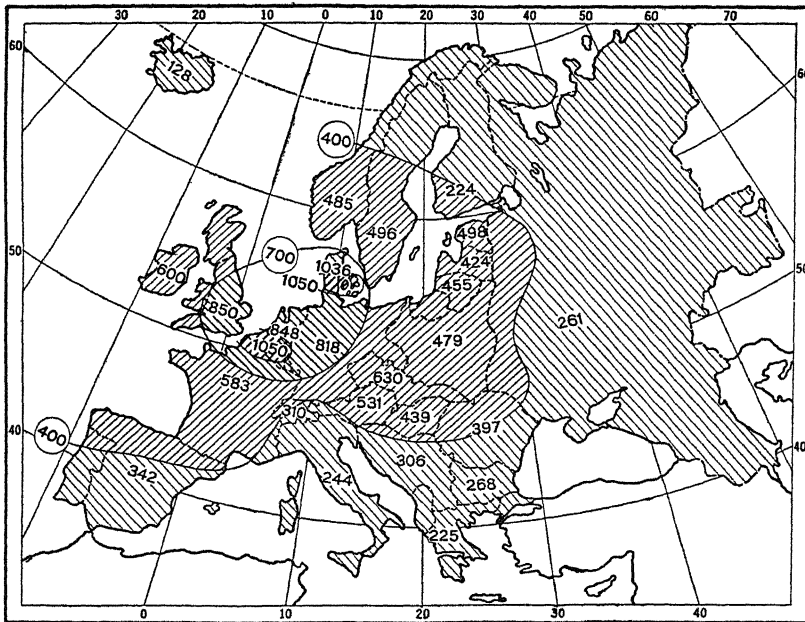
fall even lower. The more one thinks of all this the stranger it seems. The yield of crops per acre (A115) is systematically high in almost exactly the places where the number of acres per family is also high. Moreover, the percentage of the women who work in the fields is low where the fields are large and the crop heavy, but high where the fields are small and the crop light so that the amount of work is small. All this means not only that the farmers around the North Sea and in Europe A generally use more machinery and animals than those of Europe C, but it also means that they do much more work per man. This is partly because they do not have long idle periods in the cold winter or dry summer, and partly because they work with more energy and intelligence.

Farm Income.—Knowing the average yield of crops per acre and the number of acres per farm family, we can easily calculate the relative income of the farmers in various parts of Europe, at least so far as it depends upon crops. A perfect map of this sort would have to take account not only of the extra value per acre of such crops as olives and grapes, but of the pasture lands where the hay is not cut. No exact data of this sort are available, but we know enough of the general situation to be aware that in Europe A the pasturage is much better and the animals are more numerous than in the eastern parts of Europe C, so that their inclusion would probably increase rather than diminish the contrast between these two regions. Nor would the inclusion of the sheep of the Mediterranean lands materially change matters.

The general situation is shown in A119 where the estimated annual income per man on the farm in 1929 is expressed in dollars. The map is based on what the crops would have brought if sold at the prices prevailing on the farms in the United States. It appears then that the Danish and Belgium farmers have the largest income. Those of Great Britain, Holland, and western Germany come next, but Ireland, northern France, and Austria also rank high. Norway, Sweden, and Ireland would rank higher if allowance could be made for cattle and forest products supplied by the farmers. France shows a great contrast from north to south because it lies in two very distinct types of climate, the western European in the north and the Mediterranean in the south. All of Europe A, however, shows a farm income of more than \$500 according to our index figures. The transition zone, Europe B, has an average farm income only 40 or 50 per cent as great as in the regions bordering the North Sea. Outside of this, in Europe C, the income in Russia and the southern part of the Mediterranean

peninsulas falls to the neighborhood of \$25 or \$30 for every \$100 in the North Sea region.

This contrast in yield of crops per acre, in acreage of cultivated land per farm family, and in average farm income is perhaps the best established and most fundamental of all the statistical evidences of the way in which the quality of Europe changes from the North Sea outward. The change to the north is of little significance because the population there soon declines almost to the vanishing point. The southward change is familiar, and its relation to aridity and to the



A—Annual Farm Income per Man on the Farm in Europe Expressed in Dollars, 1929.

lesser needs of life because of the warmer climate makes it relatively easy to understand. The eastward change, although not so rapid as the other, is in many ways the most significant. It is not so widely understood, and its intimate connection with a continental and relatively non-cyclonic climate has been little appreciated.

The agricultural contrasts between different parts of Europe illustrate another principle which is rarely appreciated. The principle is that advances in civilization tend to increase the contrasts between one part of the world and another. Many people suppose that by

building railroads in India the British are making that country more like Great Britain. They overlook the fact that while enough railroads were being built in India to give that country 1 mile for every 50 square miles, or for every 1,050 people, Great Britain has made for her own use a mile of railway for every 5 square miles, or for every 220 people, and also a superb system of roads and other facilities for transportation the like of which is still little more than a dream in India. In the utilization of the land in Europe we see the same thing. A few hundred years ago extensive cultivation and poor tillage, with very little fertilization and low yields per acre, prevailed all over Europe. At that time Europe C used nearly the same methods as today. Even on the new tractor farms in southern Russia there is very little fertilization because the soil is so fertile that none is needed. Moreover, in dry climates fertilizers are of relatively little benefit. Farther north, where the soil is poorer and fertilizers are much needed, they are not much used because of their expense. Tractors also are of little use there because the spring season is so short and muddy that they can be kept busy only a short time. Thus the yield per acre in Russia is only a little better than formerly. On the other hand, in Europe A the yields have been doubled, and in some instances almost doubled again, through wiser methods and more intensive application of fertilizer and labor. Hence, today the contrast between Denmark and Russia is far greater than it was even a century ago. By the same token such progress as has been made in Russia puts that country correspondingly ahead of most parts of China where no appreciable change has yet occurred. This helps to maintain the dominance of Europe. But even in China there has been some change, whereas in the remoter parts of New Guinea there appears to have been none whatever. In the same way the contrast between Belgium and Hungary has increased during the last hundred years, but at the same time Hungary has increased its lead over Greece, and Greece over Egypt, and Egypt over the Pygmies of central Africa. All over the world, and in all sorts of activities, we find this same condition—a tendency for the most advanced countries to become more and more unlike the most backward ones, and for the intermediate ones to string themselves out in the intervening space at intervals which grow longer and longer. This is so contrary to the view often expressed that it needs to be strongly emphasized. The statistics of practically every line of human effort bear it out.

CHAPTER IX

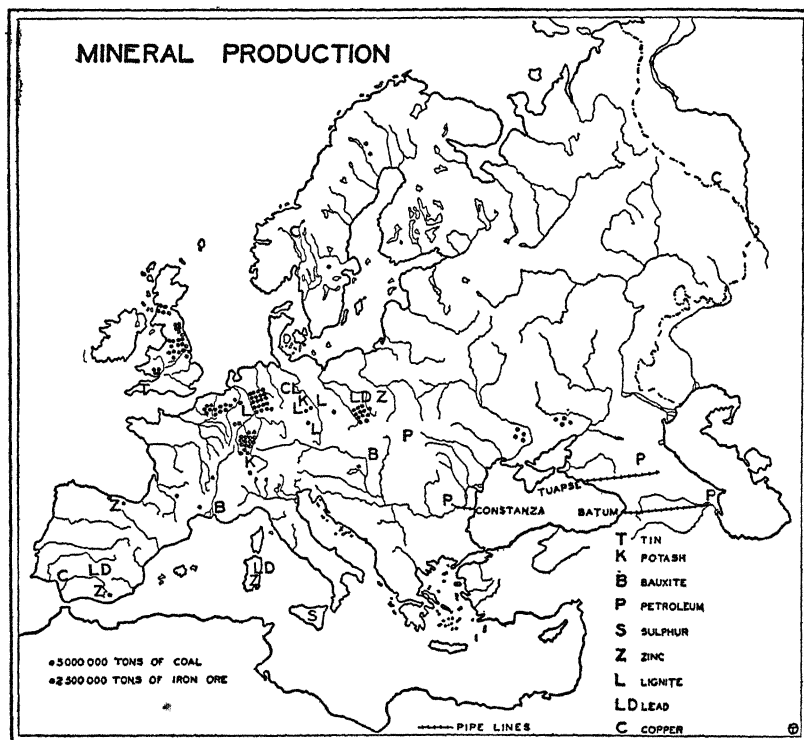
MINERALS AND POWER

Where Europe Gets Its Metals.—In view of their origin metallic ores cannot be expected in the great lowlands of Europe where the old geologic structure is covered by young materials. Nor can they be expected in large and easily worked quantities in the Alpine regions where the complex structure makes the ore zones very discontinuous and difficult to exploit. Much more favorable conditions are found in the crystalline rocks of old blocks like Scandinavia with its iron and copper, Cornwall with its tin, and Bohemia, Spain, and Sardinia with their various metals. The same is true of former piedmont slopes of these old mountains, as may be seen in the Mesozoic basins of England and France with their iron ores.

Iron.—In order to supply Europe's need of metals the resources indicated above have long been exploited. With the exception of iron and aluminum, however, the production is relatively insignificant compared with the demand, and Europe must get supplies elsewhere (A4). Even in the case of iron, although Europe has sufficient for her industrial development (A122), small supplies of foreign ore are brought from places like north Africa. The main European iron field is the Minette region of Lorraine and Luxembourg west of the Rhine in the heart of Europe A between the Vosges and the Ardennes. It was one of the prizes which France took from Germany after the World War. Its output is about three tenths of the world total, and half that of Europe. This ore not only supports an important local iron industry, but also is exported in large amounts to Germany and Belgium, where consumption far outranks the output of ore. Great Britain still ranks second among the countries of Europe as a producer of iron ore. Nevertheless, local ore furnishes only two thirds of that country's needs, and ore is imported from Spain, Sweden, and North Africa. Spain, being mainly a country of Europe C, exports most of her ore. Sweden also exports large quantities which likewise come from a portion of Europe C, namely, the Arctic region of Kiruna-Gällivare. Since the northern part of the Baltic Sea is frozen in winter this ore finds its winter outlet by rail to Narvik on the warm, unfrozen Norwegian coast. The northern ore, as well as much of that

of Central Sweden, is exported, and only a little is used for home industries. Although Russia belongs to Europe C, it does not export its iron ore but uses it at home. The chief supply in the European part of Russia comes from Krivoi Rog in the south.

Other Metals.—The tendency of western Europe to exploit its own metals to the fullest extent and also to draw on other regions to supply its further needs is especially clear in the case of some of the minor



A—Mineral Production in Europe.

metals. Europe A uses vastly more metal than all the rest of the continent. Nevertheless, it produces only 3 or 4 per cent of the world's copper, chiefly in the Harz Mountains (A122). Hence it draws on southern Spain and to a slight degree on the rest of Europe for nearly twice this amount, and upon Belgian Congo, Chile, Mexico, Canada, and even the western United States for about ten times its own production. Here again Russia uses its own ores. Very little copper is found in European Russia, but there is some in the Ural Mountains. The same general situation prevails as to lead except that Europe A, in

Silesia and elsewhere, produces nearly a tenth of the world's supply. It draws on other parts of Europe, such as southern Spain, for about as much more, and brings about twice as much from India, Canada, and other regions.

By fully utilizing its resources, Europe A is able to produce a sixth of the world's supply of zinc, but it still has to import at least as much. The distribution of zinc among the various European nations was much changed after the World War. Before that the zinc deposits of Silesia, which lie with the lead mines just north of the Silesian coal district, belonged to Germany, but now they have been given mostly to Poland. All zones of Europe together produce about 400,000 tons of zinc in good years. This amounts to 25 per cent of the world production in comparison with 40 per cent in the United States. More than half of this comes from Poland and Germany. The mines of Sardinia make Italy third producer; and those of Santander and Murcia give Spain fourth place.

Although Europe A uses nearly half the world's tin, its only mines of any importance, those of Cornwall, produce only 1 or 2 per cent of the world total. Hence all the rest must be brought from places like the Malay States, the East Indies, Colombia, and Nigeria. In respect to nickel, gold, silver, and platinum, the situation is similar, but even more extreme. Europe A produces practically none, but uses at least a third of the world's supply.

Among all the metals aluminum is the only one aside from iron in which the manufacturing countries of Europe A come anywhere near to supplying their own needs (A4). Europe's production of bauxite, the ore from which aluminum is extracted, amounts to about 60 per cent of the world's total output. Half of this usually comes from France, mostly from the southern Rhone region; more than a quarter from Hungary where it is the only important ore; and the rest from Yugoslavia. It is fortunate that iron and aluminum, which in the long run are likely to prove by far the most useful metals, are the most abundant in the earth as a whole, and are present in good quantities in Europe. It is worth noting that these are exactly the metals that any progressive people might find and exploit not far from their own homes. Only in Europe A, however, and in a few similar areas like the United States, has this been done to any great extent. It is still more remarkable that although Europe A has such poor supplies of other metals, and cannot find much more in its own continent, it nevertheless goes out all over the world and gets what it wants. The situation is like that of agriculture—the people who already have a surplus and are comfortable are the ones who get

profit from new discoveries. This often happens at the expense of other parts of the world.

Non-Metallic Earthy Minerals.—Although the origin of the non-metallic minerals is quite different from that of the metallic minerals, the principles which govern their use are much the same. The non-metallic minerals include earthy materials like salt, cement, phosphates, and gravel on the one hand, and fuels like coal and petroleum on the other. Both types occur in beds of stratified rocks. They are deposited in surface waters such as oceans, lakes, and swamps, and not by underground waters as are the metals. Instead of being pushed up from below in molten form they are carried downward from higher to lower levels as sediment or in solution. Hence they are found chiefly in plains, lowlands, or low plateaus where the strata have not been greatly uplifted, broken, contorted, and subjected to volcanic intrusions. Accordingly we find the European supply of these non-metallic products mainly in the great central plain or around its borders.

The earthy minerals fall into two types, one of which resembles iron and aluminum in being found in all the main portions of the earth, whereas the other is distributed more sporadically. The two together agree with the metals in illustrating how energetic regions like Europe A not only make full use of their own resources, but draw on other regions for resources that they lack. Salt illustrates the type which can be procured in almost any main section of the world. In spite of this wide distribution, Europe, with a quarter of the world's population, produces about half of the salt. Europe A, in turn, with only a third of Europe's inhabitants, produces more than half of Europe's supply. It furnishes itself with two or three times as much per capita as does the rest of Europe, and with five times as much per capita as does Asia. A similar situation prevails in respect to cement, another very widely distributed mineral product. Europe A, to be sure, in this case, as in many others, uses a little less than the United States, although having 50 per cent more people, but it uses nearly three times as much as do twice as many people in the rest of Europe. This means over thirty times as much per capita as in the rest of the world aside from Europe and the countries that speak English. The use of such very common materials as gravel, sand, and clay is similar. All countries have them, but western Europe makes fifty or a hundred times as much use of them as do countries like India and China. All this illustrates how much Europe A excels most parts of the world in supplying its own needs even when a product is used everywhere and is very widely available.

The situation as to the phosphates and nitrates is still more remarkable. The need for them as fertilizers is indeed great in western Europe, but by no means so great as in countries farther north or farther south where the soil is more badly leached. Europe A, however, has practically no supplies of either. Hence, as appears in A5, it manufactures them and now produces so much artificially that its production of nitrate rivals that of the rest of the world and its output of phosphate is two thirds of the world's total. It has even begun to export artificial fertilizers. Europe B and C, on the contrary, produce practically no nitrates and only a little phosphate, and let their soil deteriorate.

With potash still another situation prevails, western Europe, in Alsace and especially in the famous German beds of Stassfurt (A122), has the world's best known sources of supply. These have been worked so vigorously and cheaply that except in emergencies like the World War little attempt has been made to find and exploit deposits elsewhere. Thus western Europe still furnishes practically the whole supply of potash in spite of vast quantities which might be procured from such sources as the Dead Sea. It has been mutually agreed that Germany shall fill 70 per cent of the foreign demand and France 30 per cent.

Sulphur, on the other hand, supplies an example of the opposite type. Western Europe has very meager supplies either of the pure product or of iron pyrites which is an iron sulphide. Therefore it draws to itself a large share of the production in Europe C, especially Sicily, and in the rest of the world.

Fuels and Power.—Taking all sources into account the Dresdner Bank in its *Economic Forces of the World* estimates the world's total annual production of power from coal, oil, and water as equivalent to 1.7 billion tons of coal. Three fourths of this comes from coal, about one sixth from oil, and one twelfth from water. About 42 per cent of the total is produced in Europe and 44 per cent in the United States where the use of two thirds of the world's oil in automobiles raises the figure considerably. As for waterpower, Europe has more than the United States, but not so much as the United States and Canada combined. This resource, like coal, is found mainly in Europe A, and only sparingly in Europe C.

Fuels.—If the fuels are classified according to their occurrence and use in Europe, they fall into types like those of the metals and earthy minerals. Coal, which is far the most important, happens to be very abundant and of excellent quality in the central parts of Europe A, from Scotland and Wales through England, the Low Countries, north-

ern France, and western Germany to the corner where Germany meets Poland and Czechoslovakia. Smaller supplies are found farther east in Russia. Thus Europe as a whole produces half of the world's coal. Four fifths of this comes from Europe A, thus giving that section a production about equal to that of a somewhat larger area in the northeastern quarter of the United States. Europe A is most fortunate in having such extensive deposits, but it would obtain power in some other way if coal were not available. This is evident in the fact that the countries of Europe A mine an enormous amount of lignite, an impure brownish type of coal which is more widely distributed throughout the world than ordinary bituminous coal, but which is elsewhere almost neglected. Germany, however, mines as much of this as of bituminous coal, even though her production of the latter usually amounts to a quarter of Europe's total and is only exceeded by that of Great Britain. (See A122.)

The main coal deposits of Europe were formed in swamps which covered the floor of a depression which existed north of the Hercynian Mountain System during the Carboniferous period. In this sinking syncline, vast beds of vegetable matter accumulated, forming coal measures so thick that the process of making coal, although several times interrupted, must have gone on for millions of years. Later these deposits were partly folded, as in the Pennine anticline in England, and partly broken as in the German lowlands. Wherever these folded or broken systems come near the surface, coal has been and still is extracted.

Coal basins of this type are found in Great Britain where they include those of the Scottish Lowland, Newcastle, both sides of the Pennine Chain, and Wales. They are also found in the Sambre-Meuse region of northern France and Belgium, in the southern Limburg region of Holland, in the Aachen, Ruhr, and Silesian regions of Germany, and in southwestern Poland. Coal fields outside the Carboniferous depression are mostly of little importance, though those of the Saar Basin on the Franco-German border and of the Donetz region in south central Russia may be mentioned. Smaller deposits are found in central and southern France, Spain, Czechoslovakia, and Hungary.

A122 gives an adequate idea of the distribution of coal production. In 1929, when production was very high, Europe produced 640 million metric tons, or half the world's total. The United States, by way of comparison, produced 552 million tons that same year. Aside from the effect of the depression of 1929-34, Europe's production of bituminous coal has been nearly stationary in late years. In fact a general decrease would appear were it not that Russia doubled her output

between 1925 and 1931 and is still increasing her production. On the other hand the production of lignite or brown coal has increased greatly in Europe, reaching 220 million tons in 1929, a 50 per cent increase since 1923. Between 80 and 90 per cent of this output is concentrated in the part of the German lowlands bordering the central mountains, and on the Bohemian plateau.

Europe's coal trade, except for a rather small export from Great Britain to other continents (mainly to South America), is inter-European. Great Britain, Germany, and Poland are the main sources of supply. Because coal is bulky, the location of the mines in relation to trade routes is the all-important factor. Great Britain with its coastal coal districts has a decided advantage in this respect. Only in the Baltic does it meet the competition of Germany, and especially of Poland, which sees in coal its main means of reducing the deficit of its exports compared with its imports. The location of mines in relation to markets is responsible for very complex trade conditions between France, Belgium, and Holland. Each of them not only exports coal in considerable quantities, but imports it. Holland, for instance, with her eccentrically located Limburg mines, sells most of her output abroad, and imports an approximately equal amount from the better-located German and English mines. The reduction of the price of coal through greater efficiency at the mines will be an important factor in the future of the coal trade, especially in relation to the increased competition of oil. At present the amount of soft coal mined by the average miner in the United States is nearly four times as great as in Germany and Great Britain, and these countries in turn have a much higher efficiency than France and Belgium. Because of the exhaustion of the better coal seams and the great depth to which many of the British mines have now penetrated, the expense of mining is also a factor in determining costs, but this disadvantage is partly offset by the nearness of the British mines to the sea. Better organization and more extensive use of machinery would also help a great deal.

Oil.—In relation to petroleum Europe behaves just as it does in respect to minerals like copper, tin, sulphur, and nitrates. Western Europe has practically no petroleum, but uses far more than any other part of the world except the United States. In reaching out for the nearest available sources of supply it finds that the Galician oilfields in the foothills of the Carpathians show only a small and declining production and figure only slightly as a Polish export. Of more significance are the Rumanian fields in a similar location at the foot of the Transylvanian Alps. In spite of the depressed market, Rumania

has increased her production to 4 per cent of that of the world. But although the oil can be exported up the Danube River and from the harbor of Constanza, which is connected by pipeline with the oilfields (A122), the distance from the market is considerable. The Russian oilfields of Grozny and Baku in the Caucasus region are large producers, but they are partly located outside Europe. Moreover, their eccentric location makes it as costly to get oil from there as from other non-European sources. Such being the case, Europe has become the battlefield of the great Anglo-Persian, Standard Oil, and Royal Dutch Shell companies. The Russian government, which owns the Caucasus field, and is now the world's second producer with 12 per cent of the world total, is also a great competitor in the world's oil trade. Oil has thus become an important factor in international agreements and relations. Western Europe reaches out to get the petroleum of Persia, India, and the East Indies, as well as a good share of that of Venezuela, Mexico, and Colombia. It is worth noting that Europe A is the only important region where serious attempts are being made to extract petroleum from oil shales. Scotland leads in this, but Estonia does a little.

Waterpower.—In proportion to its available supply, Europe uses its waterpower far more fully than any other continent. This is especially true of western Europe where countries like England, Germany, and Switzerland use a large share of all that is available. The distribution of waterpower in Europe, however, is as uneven as that of almost everything else. England and Germany, although endowed with plenty of coal, use as much waterpower as Yugoslavia and Spain. In fact a map of the use of waterpower in proportion to the available supply is almost a replica of the maps of the distribution of climatic energy, health, and civilization. Nevertheless, within Europe A, although water supplies only 8 per cent of the total power, it is of outstanding value in regions which lack coal but in which the relief of the land and the rainfall are suitable. The Alpine mountains are especially good for this purpose, because the main valleys are often bordered by hanging side valleys from which the water falls in cascades or tumbles down through narrow gorges. The glacial topography of Scandinavia also helps, for there the rivers provide a sequence of waterfalls and rapids as they flow from the high divide towards the coast. Even the rounded hills of central Europe, where artificial dams provide the necessary waterlevel, are well suited for the location of power plants. The precipitation in these sections is also favorable, being high and rather evenly distributed throughout the year. The winter temperatures at low altitudes are also sufficiently

high to prevent lack of power in winter because of freezing. In the summer, on the contrary, the melting of the snow and ice on the high mountains increases the water supply.

In proportion to the population, Norway, Switzerland, and Sweden come first in the use of waterpower. Not only is their economic life as far as possible based on it, but also they will probably some day export power when once the great plans for power transmission have been realized. In Switzerland waterpower provides a volume of energy equivalent to that which would be derived from 2.5 million tons of imported coal. Here, as in the north, the conditions are favorable for the export of power in the future. Italy utilizes more than 60 per cent of her available waterpower, which comes chiefly from the Alps. The country is still trying to free herself from her heavy importation of coal. In actual energy derived from water Italy comes first among European countries. Waterpower is the base for the great industrial development of the Po Basin. France, especially in her Alpine region, Germany, Poland in the Carpathians, Spain in the Pyrenees, and Russia complete the countries with developed waterpower above 1 million horsepower. In Russia the Dnieper River plant, located where that river breaks through the outskirts of the Podolian Plateau, has an eventual capacity of $\frac{3}{4}$ million horsepower, and other still larger plants are in prospect.

Historical Relationships of European Minerals.—The use of minerals goes back to the most ancient days of human development. Stones, first rough, later polished, may have been man's first weapons and tools. The use of fire for cooking and heating was probably followed by the discovery that clay could be hardened by heating and hence used for pottery. This stimulated man's inventive faculty and led to the potter's wheel, one of the first mechanical inventions. Likewise, the use of fire may have shown that when certain rocks become very hot they melt and parts of them run out as metals that can be remodeled in any desired shape. In this way gold and silver for ornaments became well known in the ancient world. The existence of copper and tin ore together may likewise have shown the advantages of bronze, which later became so important that a period of human development is called the Bronze Age. Iron followed later, and gave its name to the Iron Age. The difficulty of melting iron ore long delayed the coming of this age.

In the classical period the use of metals, as well as of clay, was mainly developed in the Mediterranean section of Europe. The silver mines of Laurium brought wealth to Athens; the copper mines of Spain were well known; Phoenician ships sailed to the Scilly Islands and Cornwall to fetch tin for bronze. In the days of the Roman Empire, Elba was already known for its iron ore. The method of smelting it, however, remained primitive, and easily available firewood quickly became scarce in the drier Mediterranean regions. In later days the center of the metal industries migrated northwestward, as did all sorts of economic and cultural activities. There in late medieval times the iron indus-

tries of central England and central Sweden used charcoal for melting the ore, a process still employed in Sweden for certain types of especially good steel. The total European mining production at this time was only a small fraction of what it is now. The invention of power-driven machinery, which was itself a response to the demand for increased production, was the main reason for the tremendous modern increase in the use of minerals, including not only metals but fuels as well. The development of power came about very slowly. First man used only his own strength, then that of animals, next the wind for sailing and later for windmills, and finally running water for waterwheels. Then western Europe suddenly discovered ways of using coal for power and later of conveying power by electricity. This development in one small corner of the earth revolutionized the relation of the world to minerals.

CHAPTER X

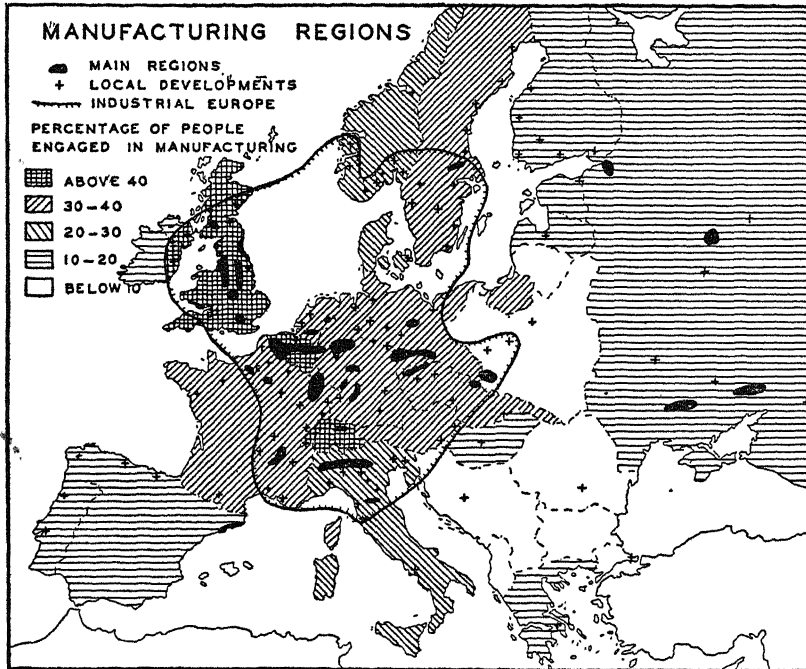
MANUFACTURING INDUSTRIES

The Present Distribution of Manufacturing.—The final result of the evolution of industry described in the latter part of this chapter is that the general distribution of industrial activity is essentially the same as that of wheat per acre, climatic efficiency, health, and the number of automobiles. Nevertheless, industrial activity has its own distinctive distribution. The most highly industrialized area, where at least half the men are engaged in industry or mining, forms a thick crescent following the coalfields from Scotland through England and Wales to northern France, Belgium, and central Germany. Ireland, with only 16 per cent of its men in these pursuits, shows a remarkable contrast to Scotland with 54. The part of Sweden centering in Stockholm (44 per cent) rises almost to the British level and offers an amazing contrast to the Norwegian coast farther west where a percentage of 6 means that the only industrial workers are a few carpenters, blacksmiths, boat builders, and the like to take care of the local needs of the villages. Sardinia, Corsica, Lithuania, and parts of Yugoslavia and Russia are the only other large areas with a similarly slight development of industry. Nevertheless, areas of this kind are scattered here and there in every country. Outlying centers with a moderate degree of industry, on the other hand, appear in central Russia, the west coast of Italy, northeastern Spain, and curiously enough the Balearic island of Majorca.

In A132 the industrial sections are shown in some detail. The intensity of industrial activity for each country as a whole is indicated, but the extremely industrialized sections of the Manchester-Liverpool and Essen-Cologne districts look no darker than the far less intensely active regions in Europe B and C. Taken as a whole, the map shows a definite concentration of manufacturing approximately inside the border of Europe A as given in A7. Outside this line the industrial development is only minor and local, except for a more regional extension of the Catalonian industries around Barcelona, and of the Russian industries around Moscow and in the Donetz region farther south. The Russian industrial regions are too far to the east and too much spread out to be included in what may properly

be called industrial Europe. Also, although the Moscow, Donetz-Dnieper, and Leningrad industrial areas, as well as the rapidly growing Ural district located outside the map, are of large extent, their relative importance is still low not only because the percentage of industrial workers is not high, but because the production per man is very limited. Moreover, in Russia as a whole the percentage of industrial workers has even now risen only a little above 10.

In Europe A the exact location of the major industrial regions



A—Industrial Activity of Europe. Shading indicates percentage of gainfully employed persons engaged in industry.

reflects the existence of coalmines. This is especially true of the zone from England to Silesia. Most of the regions, to be sure, that are now highly industrialized had rather highly developed home industries before the Industrial Revolution, and these were the basis of the modern development. Nevertheless, the presence of coal has caused many industries to move toward the coal districts and to become vastly more complex in both their processes and raw materials. The English coalbeds surrounding the Pennine Hills, supplemented in many places by beds of iron ore, happened to coincide with the greatest industrial development before the Industrial Revolution, and it is

this coincidence which has led to the present tremendous development of Lancashire, Birmingham, and Yorkshire (A132), and of the Newcastle region farther north. In southern Scotland and southern Wales a similar although less remarkable coincidence of human activity and mineral wealth is found. All these industrial sections as well as those that follow should be identified in A132.

The continuation of the coalfields of Great Britain is seen along the foot of the central European uplands and can be followed on the map by the sequence of large industrial regions. The part of northern France around Lille and extending into Flanders, the Sambre-Meuse zone of Belgium, and the so-called Ruhr region of the lower Rhine around Essen are all manufacturing areas depending on this same series of coal deposits. Grimy factories, chimneys, and smoke, and a scarcely interrupted procession of industrial cities, characterize all of them. Southeast of the Harz Mountains comes the Thuringian Basin, where the industrial development is more localized, and then the Saxonian region, where lignite to a great extent replaces coal as the source of power. Beyond the Erz Mountains the Bohemian industrial region shows similar conditions. Finally, the end of this tremendous industrial zone is reached in the Silesian coalfields where political developments after the War and the division of a unified physical region between Germany, Poland, and Czechoslovakia have tragically interfered with industrial progress. Far to the east in Russia the Donetz Basin may be considered an outlier of this same central European coalbelt. In all these regions the dominant industries are prevaillingly of the so-called heavy type. Blast furnaces, steel rolling mills, and foundries are located close to the coalmines and furnish vast amounts of steel in all shapes and sizes. Glass and pottery works are located not far away. Around these, and more removed from the grime of the heavier industries, are textile and chemical factories which need a smaller supply of fuel.

Outside the coalfields, but not far from them, many cities and their surrounding districts form active manufacturing districts which use some coal but mainly carry on the lighter kinds of manufacturing. They specialize in what are called consumer's goods—the kind we buy in stores—and not producer's goods such as machines, steel rails, structural iron, and cloth. A string of such places along the western and southern border of the coalfields begins with Belfast and Dublin in Ireland, expands in Bristol and reaches huge proportions in London and Paris beyond Amiens. In the Lorraine region of eastern France it reflects the existence of the Minette iron ores and the proximity of the coal of the Saar Basin a little farther north and just southeast

of Luxembourg. The Rhine-graben combines the advantages of a central location and excellent river transportation with the existence of a dense population, and hence of abundant labor. The rather important Neckar industrial district shows how local home industries helped by modest waterpower, energetic organizers, and a good water-supply can be transformed into modern industries even if there is no coal and only an inadequate supply of waterpower. Farther east this string of industrial centers is continued in Munich, Vienna, and Budapest. Separated from these by a long interval is the new industrial center of southern Russia including the Dnieper waterpower development and the Krivoi Rog iron mines.

North of the coalfields and not far from them a similar string of industrial centers begins with Antwerp and the Dutch cities, and continues through Hannover and the huge industrial unit of Berlin to the great cotton factories of Lodz in Poland and the more diverse manufactures of Warsaw. Separated from these by a long interval we have in the north the industrial centers of Copenhagen and central Sweden with Stockholm, famous for the beauty and high quality of their cutlery, glass, and other goods. Farther east the minor center of the less varied Baltic industries is found at Riga, while Leningrad, and the Moscow region, with their large and growing industries, complete the northern series unless we include the Ural district on the borders of Asia. In contrast to these new northern centers of manufacturing we have on the south at least three centers where old industries still survive and have made great growth. Barcelona is the only large manufacturing center in Spain. Florence and the Arno Basin join with Naples to represent handicrafts, together with some modern factories whose products attain small volume but considerable value although using very little power.

Finally, surrounding the Alps we have areas where waterpower is a really important factor in manufacturing. Such power is now the basis of a great industrial development in France, Switzerland, and northern Italy. Although no coal is available except by transportation over long distances, the waterpower has made it possible to concentrate the old industries in modern plants. In France the tremendous development of waterpower in the Alps around Grenoble intensifies the importance which this region obtained originally through the silk industry at Lyons. The Swiss industrial regions from Geneva to the Lake of Constance and especially around Zürich are an unusually good illustration of the way in which skillful specialization in products which need little power can overcome the handicap of lack of raw materials, as well as coal. The Po Basin represents the industrial

efforts of a great old nation which constantly renews its youth. But whereas Venice was once the main center of manufacturing, that honor has now moved nearer the Alps, to Milan and Turin. In addition to these areas of Alpine waterpower there is also a waterpower area in the Scandinavian Peninsula and Finland. Here the plants are so scattered that many little crosses appear in A132, but even Tammerfors, the largest Finnish center, is small. In Finland, and still more in Sweden, the many local sources of waterpower are used mainly to exploit the timber sources, but in some instances, especially on the south coast of Norway, the influence of abundant power is shown in the location of chemical and sometimes of metallurgical plants.

The Character of European Manufacturing.—We may well conclude this chapter by comparing European industry with that of the United States. We shall speak only in the most general terms, since details must be left for the chapters on individual countries. The consumption of fuels, metals, clothing materials, and rubber provides one of the best measures of the total output of manufactured goods. Calling the consumption of each product in the United States 100, it appears that in times of what we call normal prosperity Europe uses approximately the following amounts:

Wool	.....	400	Iron	. . . . .	115
Cotton	. . . .	160	Copper	.....	90
Zinc	. . . .	145	Rubber	.....	55
Lead	.....	135	Silk	.....	35
Coal	.....	130 (150)	Petroleum	. . . .	30

The far greater use of wool in Europe than in the United States is remarkable. One of the minor reasons is that in the less-advanced parts of the continent, as we have seen, a great deal of wool is still raised, spun, and woven at home in the villages. A more important reason is that in view of their wearing qualities woollen clothes are in the long run cheaper than cotton, and Europe cannot afford to wear such expensive materials as can America. The main reason, however, is the climate. It permits sheep but not cotton to thrive in Europe. Hence the habit of wearing woollen clothes became fixed there many centuries ago. Moreover, the cool weather of much of Europe permits wool to be worn all summer, thus doing away with any real need of cotton clothing. The cold winters of central and eastern Europe and the low winter temperature maintained in the houses of western Europe make woollen clothing a necessity more than half the year. The English, for example, wear woollen underclothing far more than do Americans. Some of them actually keep it on when they live in the tropics. Because of all this, woollen factories play a much larger

part in European industry than in that of the United States. Practically every country in Europe except Albania, the Irish Free State, Hungary, and Rumania imports wool for manufacturing. No other product except cotton is so universally imported. The total import is 70 or 80 per cent greater than the amount produced in Europe. France and Great Britain, with Germany and Russia closely following them, use most of the wool.

In spite of this abundance of wool, the average European buys almost exactly the same weight of woollen clothes per year as the average American. The difference lies in the fact that the American has other clothing in far greater amounts—four times as much made of cotton, and ten or twelve times as much made of silk. Since cotton is so universally imported into Europe there must be at least a few cotton mills in every country. Nevertheless, Great Britain uses a quarter of all the cotton imported into Europe, and Germany and France each about one eighth. This leaves half for all the remaining countries. No country in Europe produces any cotton worth mentioning, although a very little is raised in each of the countries bordering the Mediterranean Sea except France. Russia produces about one tenth as much as the United States, but this is in the Asiatic portion. Although Europe manufactures 60 per cent more cotton than the United States, this is only one fourth as much per capita as in the American country. Germany, however, makes most of the dyes that are used for both the woollen and the cotton goods, although Great Britain and France have advanced greatly in this respect since the World War. The German factories for making dyes out of coal tar are so large that Europe makes nearly three quarters of the world's dyes in contrast to not quite a quarter in the United States.

Turning to the other end of the preceding table, Europe uses far less petroleum, silk, and rubber than the United States because it cannot afford luxuries. The rubber, of course, is used mainly in the tires of motor vehicles. So far as motorcycles are concerned, Europe goes far ahead of the United States, having more than 20 times as many. The two regions are about equally well supplied with motor buses, although this means only one fourth as many in Europe in proportion to the population. When it comes to trucks Europe falls to only half as many as the United States. The most outstanding difference, however, and the one that most fully reveals the contrast in economic level, is that Europe has only one passenger automobile for every seven in the United States. It makes only one eighth of the world's automobiles, practically all the rest coming from the United States and Canada. This means, of course, that although France,

England, Germany, and Italy all have automobile and tire factories, there is no great center for these industries like the one in Michigan and Ohio which forms so marked a feature of the United States. Great oil refineries such as those of New Jersey opposite New York, or of Philadelphia, New Orleans, eastern Texas, and Los Angeles, are also almost unknown. Even fields of storage tanks such as are found near all the cities of the United States, are a rare sight in Europe.

The low consumption of copper in Europe is partly due to the comparative poverty which makes automobiles as well as silk stockings a great luxury there. The small number of motor-vehicle factories in itself restricts the use of copper. A greater reason for the relatively small use of copper in Europe is that electric wires are less used there than in the United States. The total use of electric power is approximately the same in the two regions, and Europe has a third more miles of telegraph wires. Nevertheless, it has only two telephones for every five in the United States, and the telephones are not nearly so widely spread. Moreover, although many small villages, as well as cities, have electric lights, the total use of such lights is far less than in the United States because the number of outlets per house and the number of little electrical appliances like toasters and flatirons is far smaller. All this of course means a correspondingly small number of factories devoted to making electrical appliances. Nevertheless, in a good year Europe produces about 1,450 million dollars' worth of electrotechnical products against 1,700 million dollars' worth in the United States. Germany produces about half of this and Great Britain a quarter.

The consumption of coal is often used as a measure of industrial activity. This is legitimate, but allowance must be made for the coal consumed for non-industrial purposes. The table above shows that, including all kinds of coal and allowing for the difference in heating value of lignite and bituminous coal, Europe consumes the equivalent of 130 tons for every hundred consumed in the United States. If the American anthracite is omitted the figure becomes 150. This probably comes close to representing the relative value of the total industrial activity of Europe compared with America. Two conditions tend to keep the consumption of coal low in Europe compared with the United States, but not in comparison with the rest of the world. One is the fact that Europe has few long stretches of unproductive railroad where the engines burn much coal in traversing sparsely populated country like our dry plains and Rocky Mountains. Another and more important condition is that in western and southern Europe the winters are warmer than in the thickly settled parts of the United States. Moreover, in large sections of the colder parts of Europe the

people cannot afford to burn coal but can obtain wood locally. Then, too, the houses are smaller than in the United States, and there are many reasons for wearing woolen clothes as we have seen. Hence the consumption of coal for heating purposes is far less than in the United States.

From all this we conclude that we may omit the American anthracite from consideration, since it is mainly used for heating houses. In that case the industrial activity of the two regions is approximately measured by the fact that Europe consumes about 50 per cent more coal of other sorts than does the United States. This is not far from the corresponding ratios for cotton, zinc, and lead. The great excess of woolen factories in Europe more or less balances the deficiency in automobile factories.

The relative consumption of iron in Europe (115 in the table) is decidedly less than that of coal. There are three chief reasons for this. One is the comparative scarcity of automobile factories which are among the chief users of iron. A second is that new construction is less active here than in the United States because old machines and buildings are not scrapped so soon. The third is that Europe builds and uses much less machinery than the United States. In recent years when manufacturing has been active the six leading countries of Europe have made machinery worth about 2 billion dollars in comparison with 4 billion in the United States. Great Britain and Germany together account for more than two thirds of the European output.

Europe's industries employ about 41,000,000 men and 13,000,000 women in contrast to about 12,000,000 men and 2,500,000 women in those of the United States. Assuming that Europe's total industrial production is 50 per cent greater than that of the United States, this means that in order to convert a given amount of metal, fiber, or other raw material into the finished product, Europe uses more than 250 people for every 100 used in the United States. The standards of living must be correspondingly lower in Europe than in America. Thus industry, like agriculture, shows that the whole aspect of life is different in the two continents. Of course Europe A rises well above the average of the continent as a whole, and Europe C falls below it, but there are corresponding differences in the United States. Hence when the standards of living of the two regions are compared they overlap, but no part of Europe rises so high as the most-favored parts of the United States, and it is doubtful whether any large part of the United States falls so low as the most backward parts of Europe.

Causes of Differences in Industrial Productivity in Europe and America.—So great a difference in productivity needs explanation. The most deep-seated cause is probably the mature development and consequently dense population of Europe. Because of this the farmers have been poor since early times, as we have seen elsewhere. The earnings of the farmers in the long run set the scale of wages in manufacturing. No one will long continue to pay high wages to industrial workers when thousands of farmers are ready to flock in for lower wages. Hence the overcrowded farms have long given Europe an excessive labor supply. This has tended not only to keep wages low, but also to retard the introduction of labor-saving machinery. Even now it is often cheaper to hire more men than to introduce the complex machines of America.

From this, as well as from the relative conservatism which is natural in an old country, it comes to pass not only that wages are low, but that small industrial units still play a great part in European industry. In the leading countries there are indeed many huge factories with an organization as complex as anywhere in the world. Nevertheless, there are still vast phases of industry in which labor-saving machinery and large units cannot compete with handwork by people who are content with a quarter of the wages that prevail in America. Thus even England has more small, home factories than America, and away from the North Sea this type of industry becomes more and more prominent. Only in the Russian part of Europe C has it been forcibly broken down, but even there it apparently persists more than would appear from the accounts of the great new factories.

Historical Development. *The Origin of Manufacturing.*—Manufacturing, like other higher cultural activities, developed first in the eastern Mediterranean region, and then progressed toward the northwest. It arose in the home, where the self-sufficing primitive family produced for itself all that it needed in the way of weapons for defense or hunting, tools for building shelters, clothing for protection and adornment, and household utensils for personal convenience. The methods and results of these early industries were extremely primitive. Weapons and tools were made of stone, and clothing was fashioned from animal skins to be worn when the severity of the weather made it necessary.

This stage of manufacturing has prevailed throughout most of the history of mankind. It was characteristic of both the Old and the New Stone Ages, which were vastly longer than the period since the dawn of civilization. It still prevails in remote parts of every continent except Europe. In Europe its disappearance began when the civilization of the river lowlands of Egypt and Mesopotamia spread westward across the Mediterranean. Manufactured products became more elaborate and were better finished than hitherto. The pottery of these earliest civilizations shows a skill and artistic sense which indicate that it was made with a purpose beyond mere necessity. Garments were woven out of

wool, which was the most available product because wandering flocks of sheep had already become a feature of these regions with their long dry summers. Life had more material comforts than were possible in the earlier days of the cave dwellers. Bread was made out of flour, oil pressed out of olives, and wine made from grapes. Nevertheless, the family remained the industrial center, and people of all classes worked with their hands. The kings and chieftains of the Homeric period worked with their slaves and followers in the fields, and turned their hands, when need arose, to the manufacturing of furniture, implements, and arms. The queens spun and wove with the women of their households, and did not disdain to superintend the washing of the family linen, or even to participate in it.

Home industries still continue in Europe to a degree unknown in the United States. They have indeed declined as a result of cheap mass production and the specialization of city life, but it is surprising how much is left. In the villages of eastern Europe the home is still the center of most of the manufacturing so far as this is based on local raw materials. Nothing pleases the Bulgarian peasant woman more than to have her guests admire the woollen rugs and blankets which she has made. The Latvian housewife takes pride in her linen curtains and dresses made from her own flax. Her husband may be at work on a home-made cart or ox-yoke. Even in western Europe, so proud of its highly developed industries, a great amount of primitive manufacturing is still carried on in the homes of the villages. Besides supplying their own household needs the villagers often specialize locally in certain products to be sold elsewhere. The women of southern France and Flanders, sitting in front of their houses, work patiently on the beautiful hand-made laces which American tourists love to bring home. In Switzerland the long unproductive winters are used by the men to carve the well-known cuckoo clocks, toys, and other wooden articles. Even in European cities it is surprising to see how many people make jewelry, leather goods, pottery, and all sorts of little articles in their own homes. Often only two or three people, all relatives, are at work. In France, Italy, and all parts of the zones called Europe B and C this has long been the practice, although now it is disappearing, especially in Russia.

Ancient Manufacturing Cities.—Although the ancient city people originally based their manufacturing on local raw materials, an increased demand for their goods and a better development of trade led them to import not only raw products but likewise skilled labor in the form of slaves. Consequently ancient manufacturing expanded most rapidly in centers of transportation, especially in those located on harbors. In the old Greek world Athens and Corinth were the most important manufacturing centers. In them, according to Calhoun, there were pullers and dyers, workers in cloth factories, hatmakers, leather manufactures, jewelers, builders and masons, furniture and cabinet makers, potters, and manufacturers of shields, spears, bows, knives, helmets, breastplates, and wagons. Corinth owed its importance to its location on the isthmus between the Aegean Sea and the Gulf of Corinth; it had harbors on both sides and a kind of tramway to transport goods across the isthmus.

After the breakdown of the Roman Empire, the center of manufacturing swung back to the east, and Constantinople took the place of Rome. Here flourished all the crafts of antiquity, together with some new ones. Great silk factories worked up the products of Syria and Greece. Besides the thousands of

craftsmen making articles of luxury which would first strike the eyes of the European observer, there were the makers of textiles, metals, weapons, and other wares.

Medieval Industries.—Throughout the rest of Europe manufacturing declined with the decline of the cities during the Dark Ages. Not until the Crusades opened the minds of northern Europe to a less simple life after A.D. 1100, did a new awakening ensue. Then manufacturing resumed its northwestward progress, and northern Italy became the nucleus of an industrial renaissance. Florence, Milan, and Genoa were famous for their manufactured products. Venice became the main industrial center. The Venetians introduced the silk industry from Byzantium (Constantinople), wove woolen and cotton goods, and had extensive glassworks and iron and brass foundries. From the east, probably, they took the idea of a rigid guild system, which later spread to western Europe. This system had long been practiced in Byzantium, but was there based on slave labor, whereas when brought to the manufacturing cities of Europe it was carried on by free craftsmen. At the same general time southern Spain under the Moors had its period of industrial progress. Thus the northern Mediterranean was the center of the world's industry—a region of production and also of trade where the products of both eastern and northern Europe were exchanged for its own fine wares.

Meanwhile the northwestward progress of manufacturing continued. Northern Europe was awakening to a new life. Along the trade routes that led from Italy the cities of France and Germany became centers of industrial development based on the guilds. Then the Hanseatic League arose on the shores of the North Sea and the Baltic, and intensified the growth of many commercial and industrial cities. This development was especially strong in the cities of Flanders with Bruges as the center. The long-established woolen industry gained wide importance, for in the Middle Ages wool was still the chief clothing material. Other industries did likewise. While this was happening the Italian and Spanish cities lost their supremacy through the breakdown of the Italian overland trade from the Mediterranean eastward and through the decline and final collapse of the Moorish cities in Spain. When this happened Flanders was ready to take the lead and become the main industrial region of Europe. Bruges, Ghent, and later Antwerp not only were the centers of manufacturing in the Europe of the Fifteenth Century, but dominated trade and commerce. Thus the center of industrial activity had at last reached the same general North Sea region where agriculture was also approaching its highest development.

Location of Manufacturing at the Time of the Industrial Revolution.—Within the North Sea area as a whole, there was still room for a considerable change in the distribution of manufacturing. The second part of the sixteenth century and especially the seventeenth century saw the relative decline of Flanders. Political factors were mainly responsible. Spain and later Austria controlled the land. The new-born Dutch Republic blockaded the outlet of Antwerp which had succeeded Bruges where the harbor had become filled with silt swept along the coast by the currents. Many Flemish Protestants, representing the better class of the population, had fled to Holland. Together with French Huguenots expelled by France, they brought new industrial development in this country of seafarers. But Holland was too small to become the industrial leader.

France and England were especially well fitted for such leadership. France, then at the peak of its power, was long the first industrial country of the world. But its many wars, not always successful, impoverished the country, and the rigid political system and the conservative temperament of the people prevented the industries from having the freedom that they needed. In England the factors making for success were much better. Skilled and in some cases wealthy immigrants, fleeing from political turmoil or religious persecution in Flanders, France, and elsewhere, brought new skill and energy to British industries. They modernized the local home industries and made England the world's leader in the production of woolen textiles which were then the most important type of manufactured goods. Within the limits of England the greatest industrial development first took place in the eastern lowland. By the middle of the eighteenth century, however, a further shift had occurred toward the source of the wool supply, toward a poor region where agriculture offered little competition in procuring labor, and toward harbors facing America and its growing colonial market. Meanwhile, being isolated on an island and therefore little affected by wars like those which continually embroiled France with its continental neighbors, England gained greatly in political strength, especially after the decline of the Dutch Republic. Her trade increased rapidly; new lines of communication with the rest of the world were established. Colonial conquests opened new markets for her products, and the atmosphere was ready for a new era—the Industrial Revolution which began in the second half of the eighteenth century and reached its height in the nineteenth.

The great features of this revolution were the invention of machinery, the consequent use of power based on coal, and hence a great increase in the use of iron and other metals. All these things were responses to a demand. They were not the result of chance or of the stimulus offered by the mere presence of coal and iron, as is often supposed. The demand for machinery, and hence for coal and iron, arose in England because by 1750 the manufacturing industries of the world had reached their highest development in the same general sections of Europe where they are now most highly developed. The same conditions which caused the old hand industries to reach so high a stage led inventors to make new machines and seek sources of power to run them. By sheer accident it happened that the very regions which were the leaders in this had some of the world's best supplies of both coal and iron. This naturally afforded a great stimulus to the new kind of manufacturing. It also caused some shifting of the centers of activity within the general industrial region of western Europe, together with the growth of many new cities to carry on the heavy industries connected with the production of iron and with other processes like the making of glass which require much fuel.

The essential point of all this is that before the Industrial Revolution the progress of industry, agriculture, trade, and civilization in general, had given western Europe and especially the parts near the North Sea the unquestioned supremacy of the world in industry. Within this region, quite without respect to coal and iron, England, the Low Countries, northern France, and the neighboring sections of Germany held the lead. Among these countries England stood first. Hence there the demand for better methods was strongest, and the incentive to invention greatest. Accordingly in that country, almost on the top of wonderful deposits of coal and iron, there came to pass an industrial revolution

which gave to those beds a wholly unexpected significance. Where England led, the other countries followed suit, and Europe in the nineteenth century entered a period of hitherto unknown industrial progress: As one goes away from the North Sea center, the force of this revolution becomes less and less. This is one reason why Russia's attempt to do in a decade what England did in a century and a half is of such absorbing interest.*

* For a fuller discussion of the change in the distribution of manufacturing in Europe, see *Economic and Social Geography*, by Huntington, Williams, and Van Valkenburg, New York, 1933, pp. 306, 479-485, 506-515, 556, 559.

CHAPTER XI

TRADE AND COMMERCE

Advantages of Europe for Trade.—Modern Europe has all the essential factors for a rich development of trade and commerce. Not only is the continent as a whole very active, but there are great differences between the products of different regions, and the location of the continent gives it every advantage for exchange of goods with other continents. Let us consider the nature of some of these advantages.

1. *Climate.*—Apart from its direct effect upon man and upon agricultural productivity the climate of Europe influences trade because it causes essential differences in regional production. Timber from the northern coniferous forests, wheat and corn from the Danube states, dairy products from Holland and Denmark, wines from France and Italy, and citrus fruit and olive oil from the Mediterranean are examples of regional responses to climate which are widely shipped from one European country to another.

2. *Relief.*—There is likewise a tendency toward exchange between lowlands and mountains because of their different types of production. In the Po Basin, for example, cities at the line of contact between the lowlands and the mountains owe their establishment and early growth to markets in which the timber, wines, and chestnuts of the mountain slopes were exchanged for the cereals of the plains.

3. *Mineral Resources.*—Such resources as coal, oil, metals, and minerals like potash, bauxite, and phosphate are often, of course, used locally for manufacturing, but in many cases large local surpluses are available for commerce. In northern Sweden the iron ore of Kiruna and Gellivare, mined under the disadvantage of a climate inside the Arctic Circle, is transported to the Baltic and the Atlantic, while food and other articles have to be brought in for the mining population.

4. *Stage of Industrial Development.*—The European zones of culture show quite different stages of development. On the one hand Europe A contains progressive old countries with natural resources inadequate to the population but with a great variety of manufac-

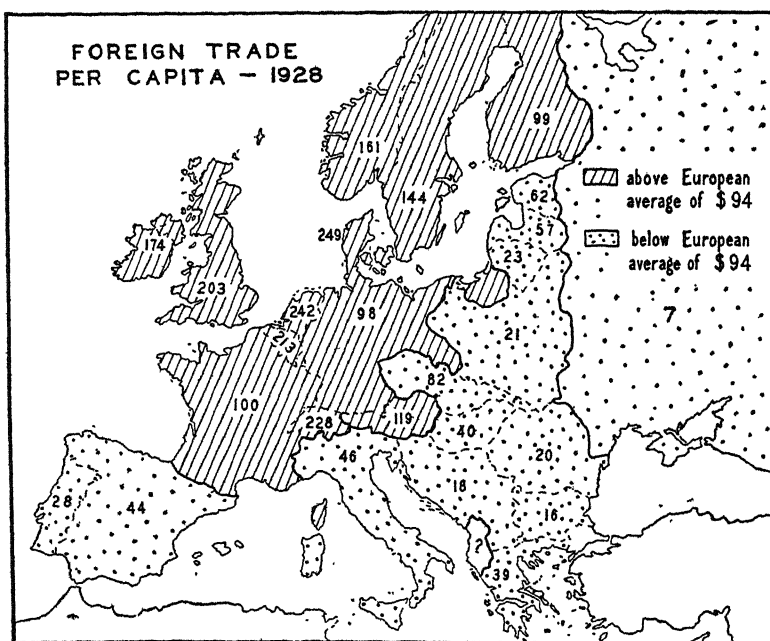
tured products or of specialized products of the land. These form a surplus whereby the inhabitants satisfy their demand for the missing raw materials, food, and luxuries. On the other hand Europe C consists of backward countries with poorly developed resources, few and simple products, relatively little manufacturing, and a small surplus used to satisfy a demand for a few simple manufactures. The contrast between Holland and Rumania, as given in Chapter I, shows this very well, although a highly industrialized country like Belgium shows the contrast even better than Holland. The Belgian exports consist mainly of manufactured products like iron and steel, machinery and textiles; the imports consist of grain, raw cotton and wool, iron ore, coal, timber, and similar products. Rumania sells grains, live cattle, and oil; its imports are mainly manufactures like cotton yarn and cloth, iron and steel, and machinery. So far as Europe A and Europe C complement each other, it may be considered an asset to trade and transportation, although in reality the backwardness of Europe C and its poor buying power decrease this significance considerably.

• 5. *Race and Culture.*—National differences in artistic sense and taste, and the development of industries based on these, are another factor in promoting exchange. Paris is a good example of how French culture has developed a surplus of articles based on this national asset. Vienna owes part of its commercial importance to similar conditions, and the porcelain of Copenhagen and Dresden, the glass of Venice, the laces of Flanders, and the embroideries of Switzerland are in large measure based on the artistic feeling of the population.

Maps of Trade.—In spite of all this the international trade of Europe consists mainly of the activities of the countries forming Europe A. They export great quantities of goods to other countries in the form of manufactured products and articles of luxury, while they import a great deal of food and raw materials. How this trade developed and has partly declined in later years is brought out in the chapters on land utilization and manufacturing. In addition to this, however, a large share of the trade of Europe consists of the exchange of products between the countries of Europe A. About a third of all the imports of France and Germany, for example, come from the other countries of Europe A, while well toward half of their exports go to these same countries. This is extraordinary when we remember how largely these various countries do the same work, and that all of them together comprise little more than one tenth of the world's

population. The secret of course is that these people are very active and prosperous, relatively speaking, and can afford to pay for goods which differ only a little from those that they themselves produce.

These conditions are summarized in A146, indicating the amount of foreign trade per capita in a prosperous year. These amounts vary from year to year, but the relative values still remain about the same. Of the five countries with an annual foreign trade above \$200 per capita in A146 four are small—namely, Denmark, Holland, Switzerland, and Belgium. Each of these profits from the large markets of its big

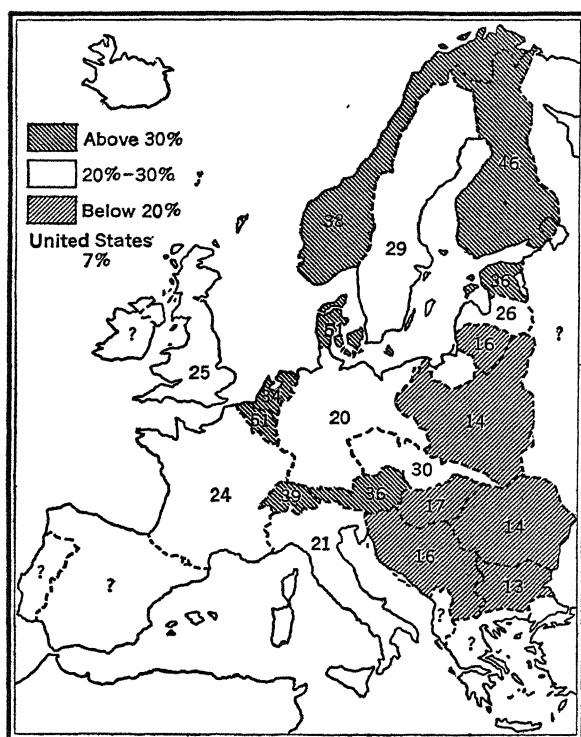


A—Foreign Trade per Capita in Europe.

neighbors. Great Britain, the fifth country with a per capita trade above \$200, is the best European example of a country basing its economic life on the export of manufactured products. Great Britain, however, also depends on the export of coal in exchange for a tremendous import of food and raw material. In A146 Scandinavia, Ireland, and Austria show figures above the average for Europe for reasons similar to those applying to the four small nations mentioned above. Germany and France show more stabilized conditions and a greater self-sufficiency and hence not so large a foreign trade per capita. The great drop in trade comes toward the east and south

where the per capita trade of Bulgaria is one fifteenth that of Denmark. The reasons for this have been brought out in previous pages and need not be repeated.

A147 shows what the export trade means for the various European countries. Denmark and Belgium export more than half of their home production, which indicates their great dependence upon foreign markets. For Norway, Finland, Estonia, Holland, and Switzerland



A—Percentage of Home Production Exported from Europe.

the amount exported is about one third of what each country produces, while the large powers, England, France, Germany, and Italy show a percentage between one fourth and one fifth. Eastern Europe is far more self-sufficient, the exports varying between one fifth and one tenth of the home production. Finally, A148 shows what percentage of the exported products remains in Europe, and consequently, also, how much goes out of Europe. Great Britain, which sends 67 per cent of its exports outside Europe and only 33 per cent to its own continent, stands by itself, thus demonstrating its worldwide trade relations.

greater weight and better quality of the animals in Europe than in most parts of the world. Except in the case of corn the production of cereals, meats, and other staple foodstuffs far exceeds that of the United States. Nevertheless, if we exclude Russia, the rest of Europe has to import from 3 to 13 per cent of the total world production of all the cereals except rice and millet. These percentages do not sound large, but their significance increases when one remembers that they represent the part of each crop imported by only 19 per cent of the world's population at most, and mainly by about 14 per cent. This means a very large overseas trade, for the relatively small amount coming from Russia to the rest of Europe is shipped almost wholly by sea. The intensity of this trade is at a maximum in the immediate vicinity of the North Sea. Potatoes, vegetables, grapes, and olive oil, on the other hand, are raised in such great quantities that while they give rise to a large trade within Europe, they do not figure much in overseas trade.

Note also in this table how large a percentage of the world's breakfast table products is used in Europe. Putting the sugar raised in Europe with that which is imported from overseas (mainly to Great Britain) the Europeans use at least 36 per cent of the world's sugar or double their fair share. Coffee is similarly used, and tea and cacao in still larger amounts. The oil-producing nuts and seeds form another large factor in European commerce. The Europeans may not litter the floors of theaters and grandstands with peanut shells, but they use a third of the world's peanuts for oil and otherwise. They far surpass the United States in the use of oily seeds such as those of flax (linseed), rape, sesame, and hemp. Since cotton does not grow in their continent they import the nuts of various palm trees to supply oil like that of cotton seed. The United States does not need so large a supply of vegetable oils because it uses more animal fats, especially lard and butter.

If the first column of the table is added to the last, it appears that when its own production and its imports are combined, the non-Russian part of Europe uses more than a third of the world's cotton and jute, more than half the flax and hemp, and a still greater share of the wool. These form huge cargoes and keep many ships plowing the ocean. Rubber is not so widely used, but 28 per cent of the world's production is enough to fill hundreds of steamships every year. Only when we come to a very expensive luxury like silk do we find Europe failing to import more than would be expected on the basis of its population. In addition to all this, Europe imports vast quantities of petroleum, copper, tin, and other metals, as we saw on a previous

PERCENTAGES OF TOTAL WORLD PRODUCTION OF GREAT PRODUCTS

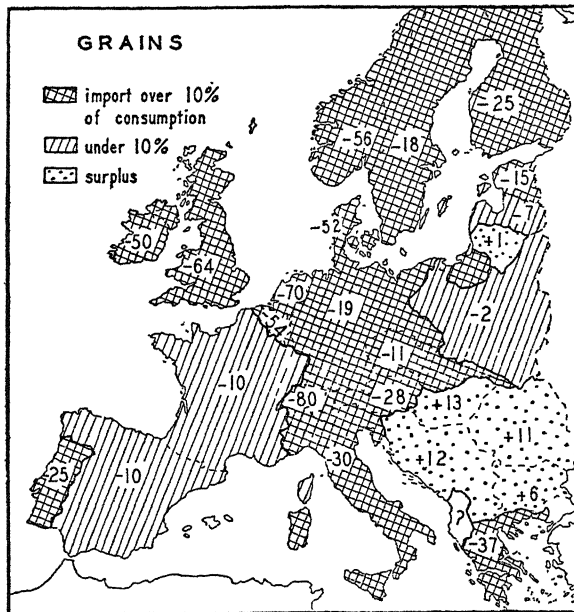
	Production in		C Imports into Europe (excluding Russia)
	A Europe	B United States	
Wheat	46	19	13
Barley	50	15	7
Corn	14	69	6
Oats	60	27	6
Rye	96	3	3
Sugar	29	5	7
Potatoes	91	6	0
Cattle	28	10	Large imports
Swine	33	21	Large imports
Sheep	37	7	Large imports
Bananas	0	0	18 ¹
Tea	0	0	58 ¹
Coffee	0	0	34
Cacao	0	0	53
Peanuts	0	8	33
Linseed, rape seed, sesame	7	11	32
Cotton seed.....	0	54	5
Copra, coconuts, palm nuts.....	0	0	51
Flax	42	0	11
Cotton	0	55	38
Jute	0	0	35
Hemp	33	0	19
Silk .....	..	0	8 ¹
Wool .....	..	..	79 ¹
Rubber	0	0	28

¹ Percentage of total entering into international trade.

page. Further information as to the production and trade of Europe appears in A3-4-5 and in the diagrams on pages 610-615.

Division of Trade Among the Continents. — The division of European imports among the other continents depends on a few main products. Cotton, wool, petroleum, wheat, meat, copper, and rubber are the seven most important articles imported into Europe. Together they form nearly a third of the total imports. Since all of these except rubber come in enormous quantities from the New World,

the two Americas furnish 26 out of the 41 per cent of the imports of European countries that come from other continents. Asia and the East Indies supply only 8 per cent and Africa 3 in spite of the fact that both continents contain vast areas under European control. On the other hand Australia and New Zealand, with one eighteenth the population of Africa and with only one person for every 130 in Asia and the East Indies, supply almost as much as Africa. This illustrates the fact that the foreign trade of a country depends upon the quality of the people, their stage of culture, and the amount of useful



A—Normal Imports versus Exports of Grain in Europe.

space at their disposal per capita rather than upon the number of people.

In return for these products the European countries send to the other continents only 31 per cent of the goods that they export. About a fifth of these goods consists of textiles in some form, ranging all the way from thread, or yarn as it is called in the statistical tables, to cloth of all types, laces, millinery, and dresses. Another quarter consists of metal goods including ordinary hardware, structural steel, such as bridge girders and rails, machinery, electrical supplies, and automobiles. The remainder includes chemicals of many kinds, leather goods, especially boots and shoes, and articles made of wood

among which paper holds a high place. In addition there are some famous national specialties such as Parisian novelties, Swiss and Dutch chocolates, Swiss watches, British cutlery, Swedish glass, and Danish chinaware. About 14 out of the 31 per cent of exports to other continents go to the two Americas, 8 per cent to Asia, 6 per cent to Africa, and 3 per cent to Australia.

Locally the type of exports varies according to the resources (A610-114). The northern countries of western Europe base much of their export trade on timber; those in the east on grain; those in the south on Mediterranean fruits including the olive. Ireland, Holland, Denmark, and the Baltic states export dairy products and meats, little changed by manufacturing. But the largest exports of all are based on the coal and iron of the great manufacturing belt which are used to produce not only metal goods but textiles made largely from imported raw materials. The gradual process of finding out how best to use natural resources has brought about certain combinations of special value such as timber cutting, dairying, and grain production in the Baltic states, manufacturing and the cultivation of Mediterranean fruits in Italy, and dairying and manufacturing in Holland. The coast fisheries of Norway and Portugal make a great difference in the exports of those countries. (See A614 and A615.)

The Development of European Commerce. 1. Ancient Mediterranean Trade.—In the ancient Mediterranean period it was so difficult to transport goods by land that trade was carried on mainly by water along the seacoast and up the rivers. The Mediterranean Sea had incomparable advantages for such traffic. In the first place it extends from east to west—not north to south—so that the same kind of weather prevails everywhere, and only one type of seamanship, as well as one type of clothing and equipment for both ships and people, is needed. In the second place numerous promontories and islands offer shelter in stormy weather. This is fortunate, for the irregular topography of the coastal zones impedes overland movements and drives people to the sea. Then, too, the main products lend themselves to trade. Salt, wine, grain, and olive oil, which were abundantly produced close to the seacoast, are easy to preserve and to transport, and hence were among the first articles of trade. On the east in early times the Mediterranean was bordered by countries which led the world in cultural development and which had a correspondingly keen interest in the contacts of foreign trade. Thus a great number of factors combined to cause trade to develop more rapidly by sea than by land.

Most prominent among the old seafaring people were the Phoenicians and Cretans whose main source of wealth was traffic by sea. The Greeks, however, were perhaps still more important in later days, and even the Romans depended on the sea relatively more than do the modern Italians. Colonies of the Phoenicians, as at Carthage, of the Greeks, as in Sicily, and later of the Romans, as in Spain, maintained contact with the mother countries by sea routes. Bold sailors circumnavigated the Spanish peninsula to reach the Scilly Islands off the

west of England. In Egypt a canal connected the Nile with the Red Sea, thus giving a water route from the Atlantic to the Indian Ocean. Battles between the Mediterranean powers were sea battles in many cases, and the victory carried with it the mastery of that sea and also of the means of transportation.

Athens and Corinth were the foremost European harbors of the pre-Roman period. They mark a northward and westward movement in the location of the centers where trade was most active. Their commerce included many products. The Sea of Marmora, and the Black Sea, especially off the mouth of the Dnieper, furnished immense quantities of salt fish; and next to bread this was the staple article of diet in Athens. Much of the bread of that city was made from Scythian grain brought from the northern and western shore of the Black Sea. The Scythians also sent cattle to Athens in exchange for oil, bronzes, and especially wine. Besides these staple products, the Scythian tombs have yielded fine specimens of Athenian pottery, jewelry, and other artistic objects. Many slaves were also sent from Scythia to Athens. The imports from the Black Sea also included flax, hemp, timber, tar, and charcoal. Since wood was scarce on the Greek coasts and hard to transport over mountain trails from the interior, the forests on the immediate shores of Asia Minor and close to the course of the lower Danube were used to supply the deficiency.

Not all the trade of this time was carried by water. On every market day a long stream of donkeys laden with grain and other farm products poured into cities like Athens from the surrounding country. More expensive goods such as the famous cloth dyed with Tyrian purple, copper vessels, pottery, jewelry, and weapons were transported long distances by land. Only articles of high value and small size—luxuries not necessities—were carried far by land, as is still the case in vast regions such as the interior of China. Some very precious goods were transported long distances by overland trails—gold from the Urals, amber from the Baltic. But such transportation by men or animals was slow and dangerous, and the trails were scarcely recognizable as such. The sea trade was also beset by many dangers. Piracy was frequent from the oldest period when the Aegean Islands were the hotbeds of pirates endangering the merchant fleets of Sidon and Tyre until finally in the nineteenth century the last stronghold on the Algerian coast fell before the power of modern weapons. Thus many circumstances combined to cause the trade per capita in ancient times to be very small except in a few main cities.

The importance of the Mediterranean Sea for transportation continued during the Roman period, but the center of activity moved still farther north and west to Rome. Ostia, the harbor of Rome, saw boats from all over the Mediterranean connecting the Roman colonies with the mother city. The extension of the Roman Empire beyond the realm of the sea caused a new and important factor to enter into commerce, namely, the famous Roman roads, which more or less remained the basis of the European road system up to the eighteenth century. These roads opened up the interior to a degree hitherto unknown. They were directed primarily toward ports on the Mediterranean Sea and thus toward Rome. Along them marched the Roman legions, and also the Roman traders. Roman settlements became important centers of trade, exchanging local products for the many articles of commerce which Rome and the Mediterranean towns had learned to supply, while the frontier towns provided commercial contact with the Germanic lands beyond the border.

β. The Medieval Situation.—The breakdown of the Roman Empire destroyed

this development. The center of activity swung back toward the east. Trade became centralized in the eastern part of the Mediterranean and did not extend so widely as before. Unstable political conditions and numerous wars interrupted former trade relations; roads were neglected, and the prosperous old Roman settlements declined in importance.

Only when the Crusaders brought northern Europe into contact with the Mediterranean and Asiatic world do we see a revival of trade. Products of the Near East and India, such as spices, sugar, pearls, and precious stones, or perfumes, silks, carpets, and glass, were brought from the harbors of the Levant to Venice and Genoa. These Italian cities became the great centers of commerce, thus marking another step northward and westward in the movement of centers of culture. From them overland roads carried a part of the eastern products to northern Europe where the demand was increasing. The Alps interposed a huge barrier to this trade, but the Rhone Valley provided a narrow route around them towards Paris and the Rhine, while from Venice the Brenner Pass made it possible, although not easy, to go directly to Munich and other newly developing towns of southern Germany. Fairs became the usual means of bringing people together for trade and were a characteristic feature of the Middle Ages, especially from the twelfth to the fourteenth centuries.

While Italy's city republics, Venice and Genoa, were at their peak, the next step in the northern and western movement of the centers of trade was in process of development. Northern Europe, now gradually settling down from migrations and wars, began to develop its own trade, using the Baltic and North seas as a means of transit. The Hanseatic League, a rather loose but powerful organization, combined the coastal and inland settlements of the Netherlands and northern Germany with those of the Scandinavian countries and extended its influence even into Russia (Novgorod). Visby in Gotland was its Baltic center. Lübeck and Danzing on the German Baltic coast became the leading commercial cities. The trade was rather complex—from southern Europe wine, salt, oil, fruits, silk, and sugar; from Russia fur, hides, leather, grain, and wax; from the Scandinavian lands timber, iron, copper, furs, livestock, blubber, fish, meat, and grains. These were exchanged for more finished foodstuffs, cloth, wines, manufactured wares, and the usual southern European imports.

Meanwhile the fall of Byzantium and the total impossibility of continuing Asiatic trade by reason of the invasions and wars of the Turks, Mongols, and others caused the northern Mediterranean region to decline. So Flanders, the richest section of the Hanseatic League, at length overshadowed it. Thus in the fourteenth century Bruges rivaled Venice as the great commercial and industrial center of Europe, and at a later date the fleet of the Netherlands with a broom at its mast head dominated the North Sea. The trade between the Mediterranean and Flanders was small since the route by sea is long, and by land the merchants were attacked by robbers. The robbers were often in league with feudal landlords who lived near the main roads in castles, like the ones whose ruins along the Rhine and Rhone now have such a romantic attraction for tourists.

3. *The Modern Era.*—The trade of Europe entered a new era about A.D. 1500. This time the shift in the location of the main centers was mainly westward because of the discovery of America. Where this shift took place in Mediterranean latitudes its impetus soon came to an end, for the greatness of Spain

and Portugal declined rapidly. Farther north it began most strongly in Great Britain, but finally affected all the regions touching the North Sea. After Columbus discovered America the gold and silver of the new continent provided a tremendous source of income. Portuguese merchants, sailing around Africa, had discovered the road to India and the Malay Spice Islands. Lisbon took the place formerly occupied by Venice and Genoa, and the Dutch and English came there to buy Asiatic products and distribute them throughout northern Europe.

Meanwhile a great change had come over the North Sea and Baltic area. The successful revolt of the northern provinces of the Netherlands—later the Dutch Republic—broke the glory of Flanders, which remained under Spanish control. Flanders was then blockaded by the Dutch fleet and deprived of its commerce. The European center of trade shifted from the Mediterranean and the Baltic to the Atlantic shores facing a world that had been newly explored. Dutch and English fleets took the American trade away from the Spanish. Finding for themselves the way to India, they there assumed the place formerly held by Portugal. The Dutch and English East India companies became the world's commercial leaders. Colonies were founded along the African coast and in the West Indies and the Americas. The French joined the Dutch and English in this effort. Thus by the beginning of the seventeenth century the world was fairly well known, its economic value had been explored, and the center of trade had become firmly established around the North Sea. It is worth noting that this region had forged to the head before the discovery of America and of the route around Africa. These discoveries temporarily gave Spain and Portugal great importance, but this waned after a century or two. Thus although the North Sea countries do not occupy so favorable a position in respect to the two Americas and Africa as does Portugal, they have nevertheless received the greatest benefit from these newly known parts of the world. The case is like that of coal; a new and previously unknown geographical advantage has greatly stimulated the already existing tendency for the North Sea region to be dominant.

For a long time the European trade with these new regions was extremely one-sided. Except in a few cases where white colonization took place, as in North America, the trade mostly took the form of bringing native products to Europe, with little exchange of European products in return. Of course, there was some export of small European articles which had value in the eyes of the natives, but most of the trade was forced on the natives under the guise of political protection or under threat of punishment. Consequently, ships sailing from Europe usually had to sail in ballast as there were no bulky European exports. The general increase in European productivity which finally resulted in the Industrial Revolution of the eighteenth century helped to change this situation, especially in England and France. The growth of the colonies, those of England in particular, worked in the same direction. This in turn led to a demand for better and speedier means of transportation and started that tremendous increase which resulted in the present conditions. The change, however, was gradual, and modern means of rapid luxurious transportation are only of recent date.

CHAPTER XII

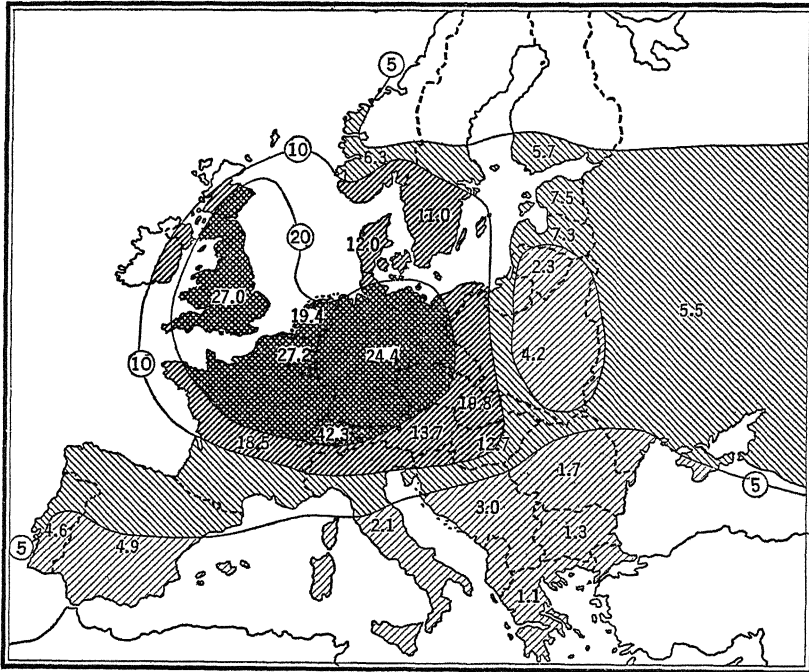
TRANSPORTATION

Europe's Advantages for Transportation.—Europe, as we have already seen, is especially favored from the standpoint of transportation. Its peninsular character with inland seas extending deep into the continent, its well-developed coastline with numerous bays, gulfs, and islands protecting the coast from the ferocity of ocean gales, its many navigable rivers with drowned outlets permitting an easy transition from ocean to continent—all these are factors in its favor. Even the relief does not offer many difficulties. On the lowlands canals connect the river systems, and railroads can easily be made. Moreover, in most cases the uplands offer convenient passages. In the few places where real barriers exist, the energy and intellect of man have found ways to cut tunnels through the mountains, as in the Alps and Pyrenees, or to carry roads by easy windings over obstacles, as on the Norwegian Plateau between Bergen and Oslo. Thus in most parts of Europe not only do difficulties of transportation no longer greatly hamper trade, but easy means of transport actually invite it. One has to go to remote corners of the Balkans or Russia to find places untouched by modern means of transportation, but all this is only a recent development.

The Means of Transportation.—It would be very instructive if we could combine in one map all the transportation facilities of each region, giving the proper weight to each. We should have to include oxen, horses, mules, asses, highways, carts, automobiles, trolley lines (or tramways as they are called in Europe), railroads, airways, canals, navigable rivers, coastal waterways, and ocean vessels. To complete the picture of European trade and commerce we should need to add data as to the number of people and the amount of freight carried by the railways, the volume of foreign commerce, and the amount of internal trade, although there are no good statistics as to the last item. To combine all these in a single map is impossible, but we can prepare separate maps of many of them, as in the case of A157, showing railway journeys per capita. A21, showing the percentage of the occupied men engaged in trade and transportation, sums up the

general situation as to activity in these respects. Note the high figure for Greece because of its intimate relation with the sea.

To begin with the part played by animals, although no map of oxen is here given, it is interesting to note that all through central Europe from central France to Bulgaria their use to draw carts as well as plows is common. This indicates not only a much slower rate of work and lower standard of living than in most parts of the United States, but also a correspondingly mild development of trade.

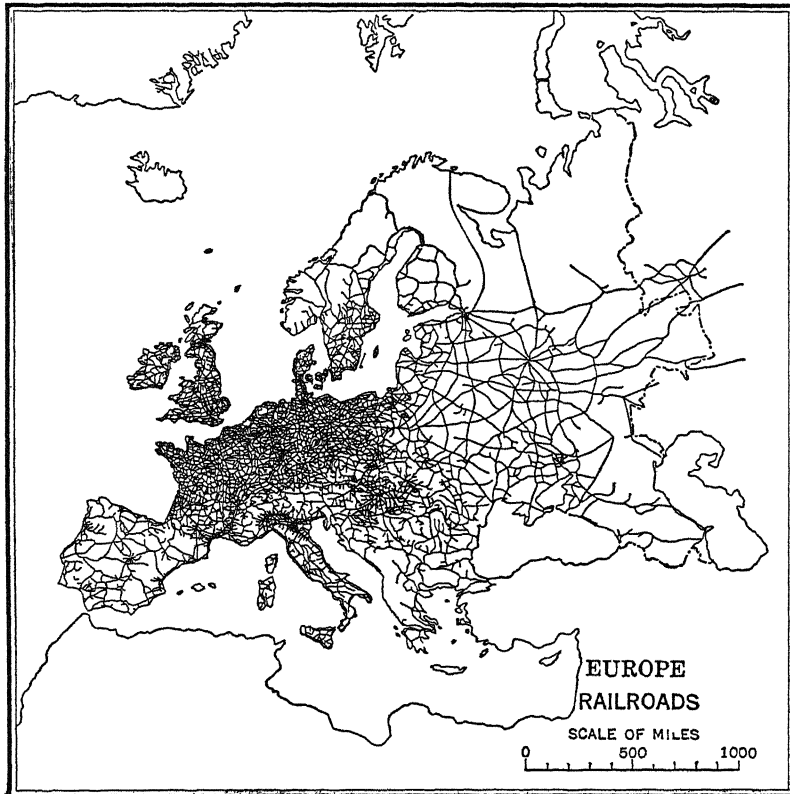


A—Railway Journeys per Capita.

(The use of horses together with mules and asses is very widespread. Naturally these animals are relatively scarce compared with people in the main manufacturing regions—less than 6 per 100 persons. Nevertheless where the people of the zone called Europe A depend mainly on agriculture, as in Denmark, a country may have a good number of horses per capita in spite of a large urban and industrial population and a great use of motor vehicles." Ireland on the west vies with the Baltic states and Russia as the European region where horses are relatively most important. This indicates that in these regions the other and more modern means of transportation are not

highly developed, and hence that commerce is relatively inactive. In southern Europe the abundant donkeys and mules are like oxen in indicating a relatively low degree of commercial activity.

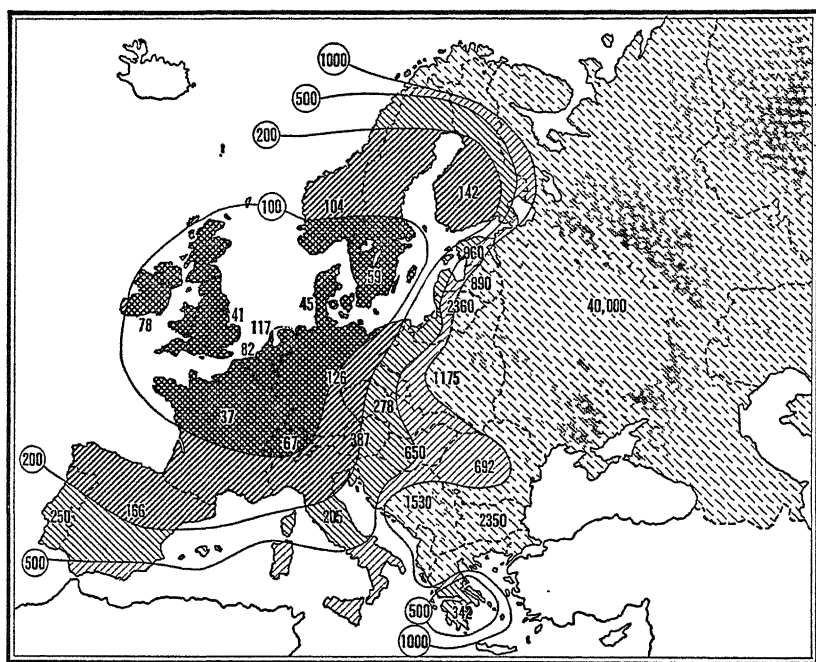
In A158 the distribution of railways shows the opposite side of the picture. Compared with other parts of the world, including even the United States, the main part of Europe is abundantly supplied with railroads. Note how extremely numerous the railroads are in Europe



A—Railways in Europe.

A, and especially in the main industrial section. A few relatively open areas show the effect of relief in places like Czechoslovakia and Switzerland, but the extraordinary thing is that so many railroads cross not only the British Highlands, the German Uplands, and the Erz Gebirge of Czechoslovakia, but even the Alps themselves. In Europe B, however, the railroad net becomes less dense; in Europe C it is quite open, and many spaces are without railroads. Some small spaces

of this sort are due to mountains like the Carpathians, Pyrenees, Apennines, and Balkans, although these are really much easier to cross than the Alps. Far larger spaces are due to the cold climate of northeastern Russia and the dry climate of the southeast of that country. The reason for the contrasts in the density of the railway net is that Europe A, by reason of its climate, crops, and industries, produces a surplus which is not only huge in the aggregate, but also large per capita, a factor of special importance. The trade of Europe C, on the contrary, is relatively small not only because the physical

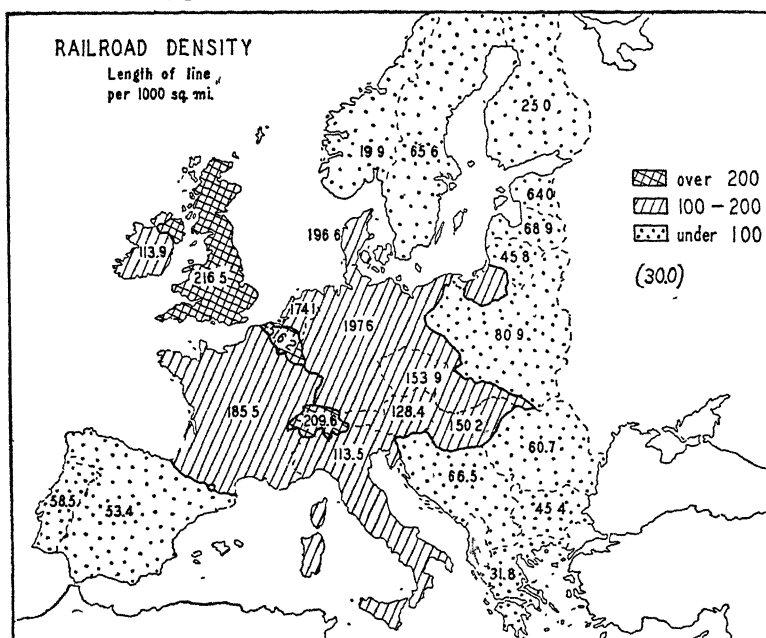


A—Persons per Passenger Automobile in Europe.

advantages there take the form of soil and level plains rather than climate, minerals, and waterways, but likewise because the people cultivate only a little land per farmer and do not work very effectively in the factories. Of course they stand far ahead of China and India in these respects, but they cannot compare with countries like Canada and Australia, or even Argentina and Chile.

A map showing the number of persons per automobile (A159) looks about like maps of the yield of wheat per acre, or of health, climate, efficiency, and the use of coal per capita. This is natural, for these maps represent the fundamental sources of the surplus which makes it

possible to use automobiles. Exceptional countries like Holland, where the number of automobiles is low, simply illustrate how one factor may supplement or displace another. Holland still carries on such active commerce by canal and river that it does not need so many railways, roads, and automobiles as do its neighbors. Taking everything together the facilities for transportation are about equally well developed all around the North Sea except where rugged relief interposes difficulties, as in northern Scotland. On the other hand, the gently undulating plain of northeastern Russia contains an area larger



A—Railroad Density by Countries in Europe.

than France and Germany with no railroads whatever. Albania also has no railroads, and Yugoslavia, although the same size as Great Britain, has only one third as many miles of railway (A160).

The situation in respect to transportation by water is similar to that by land. Great Britain, being an island near the most active part of Europe, has 40 times as great a tonnage of merchant vessels as Russia with its continental position in the less-favored part. Norway, where the geographic environment is stimulating and marine, but inhospitable, has 300 or 400 times as much shipping as Russia in proportion to the population. France, although 15 times as populous as Norway, has scarcely as large a tonnage of merchant vessels.

Yet so active is commerce in all parts of Europe A that even in France the tonnage of merchant vessels per capita is twice as great as in Portugal and 4 times as great as in Yugoslavia, both of which have long and deeply indented coasts.

Water Transportation. Merchant Marine.—The world's merchant fleet still belongs mainly to western Europe. This is true despite a remarkable increase in the share of the United States during and directly after the World War. Great Britain, with a little more than one third of the world's tonnage, comes first, whereas the United States has about one fifth. Germany, which had reached 6 per cent by 1930, is coming back to its old position after a great drop during the World War. It has just about the same tonnage as Japan. France has 5 per cent of the world's shipping, and Norway, Italy, and Holland closely approach the same figure. Sweden, Spain, Greece, and Denmark come next, each with about 2 per cent. Taken together the countries that touch the North Sea or its branch, the Skagerrak, have 55 per cent of all the world's ships. Norway easily ranks first in tonnage per capita, and is the world's most maritime country. Holland, the other Scandinavian countries, and also Greece with its inter-island traffic, rank high.

Harbors.—We have already seen many examples of the fact that the relative importance of European harbors has changed considerably since the days of ancient Greece. Even where the harbors themselves are still suitable the changes in the location of markets and in the relative productivity of the hinterland have often joined with political factors to alter their importance. In other places, even where natural conditions were unsuitable, these same factors have led to the construction of artificial harbors. Some of the harbors that were formerly most favorable cannot admit the large modern vessels without much dredging or perhaps the construction of entirely new channels. Dock space has had to be increased constantly to satisfy the demands of modern transportation.

Among the present harbors four are of outstanding international importance, for each receives shipping to the extent of over 20,000,000 tons in normal years. These are London, Hamburg, Rotterdam, and Antwerp. Each is located at a river outlet, but only Hamburg and Rotterdam have an open waterway far inland. London, including the subport of Southampton, still comes first in spite of its eccentric location in regard to the English industrial regions. The three others are strong rivals for central European trade. Hamburg looks toward Czechoslovakia and the densely populated section of central Germany. Rotterdam, with its canalized river outlet, is most favorably

located with regard to the Rhine region, but Antwerp on the Scheldt, also tries to get the trade of the Rhine in combination with that of its nearer hinterland in Belgium and northern France.

(The other European harbors which receive 10,000,000 tons of shipping or more per year are Liverpool, Genoa, Marseille, and Cherbourg. Liverpool combines with Manchester to form the great industrial harbor of Great Britain, but it has lost part of its former passenger traffic. Genoa and Marseille not only combine Mediterranean with trans-Atlantic trade, but have much traffic with Asia through the Suez Canal.) Cherbourg is mainly a passenger harbor for trans-Atlantic steamers. Other minor harbors, which nevertheless are locally significant, will be discussed in connection with individual countries.

Rivers.—Navigable rivers have played a considerable part in European transportation. Those north of the Alps have a decided advantage over those of the Mediterranean region. The great plain extending from the North Sea east into Russia offers few obstacles to the quiet flow of the water, while the equable distribution of precipitation causes a well-balanced watersupply. Only in the east does a cold, icy winter limit the practical use of rivers for transportation. Although the rivers of France have only local importance for navigation, those entering the North Sea, the Baltic, and the Black Sea afford easy entrance to the continent. This is especially true now that small obstacles have been eliminated, the channels carefully marked by buoys, the many river tolls abolished, and regular inland harbors developed in advantageous locations.

(The Rhine River is probably the world's best-developed inland waterway) In normal years more than 100,000 boats cross the border between Holland and Germany by way of the Rhine. Ruhrort-Duisburg, where the Ruhr industrial region touches the Rhine, is the world's greatest inland harbor. Mile for mile the Rhine carries many times as much freight as the Mississippi. At present the Rhine is navigable to Basel on the border of Switzerland. It is under international control, since four countries share its navigable portion. The long Rhine barges, pulled by tugboats, show by their variety of flags the international character of the trade.

The Elbe is navigable clear across Germany and is the logical trade road into Czechoslovakia; Hamburg at its mouth offers special harbor advantages. The Oder is open for small boats from the Baltic to the Silesian coalfields. Only the Vistula, among the main North Sea and Baltic rivers, remains practically worthless for navigation.

Among the rivers flowing to other seas, the Danube has all the advantages of a great artery of traffic. Because of its wide bed and stable watersupply it offers few difficulties, and it has been possible to overcome these few, as at the Black Sea delta and the Iron Gate where the river cuts around the Transylvanian Mountains in a gorge. Although the Danube empties into a nearly closed sea far from the world's main lines of trade, the river itself affords a great variety of economic possibilities. One would expect to see on it a constant stream of boats carrying grain from the east to the west and manufactures in the other direction. But the beautiful Danube by no means shows the expected traffic. The breaking up of the Austro-Hungarian Empire into new states, jealous of each other and not willing to co-operate, has made the river even less useful than formerly. The primary difficulty, however, is that the Danube, like the Mississippi, runs in the wrong direction. At one end, to be sure, it touches Germany, Austria, and Czechoslovakia, but at the other end a ship on the Danube finds itself in the least active and progressive part of Europe.

The Russian rivers, because of the gentle relief, are navigable far toward their sources. When not frozen they give to Russia a natural transportation system which as yet has by no means been equaled by the railroads and roads. The Volga, in spite of its outlet in an inland sea, is Russia's greatest river commercially as well as physically. Sentimentally it takes the same position in Russia that the Rhine takes in Germany. Although not quite so lonely as the Mississippi, it has no such traffic as the Rhine because it does not connect regions of high industrial and commercial activity.

Canals.—The inland waterway system of Europe is extended and completed by numerous canals. These are mainly the product of the last centuries. In Holland, however, the Romans are supposed to have dug a canal giving the Rhine its northern outlet through the Ysel. In later centuries barges there took the place of the wagons of other lands, and towboats to some extent supplanted coaches for passenger travel. In the eighteenth century the increased demand for transportation and the advantages of using the available rivers brought canals strongly to the foreground. France started the work with some canals which now form part of a very complete system connecting all the rivers and penetrating all parts of the country. The latest addition is the canal from Marseille to the Rhone, which tunnels the hills separating Marseille from the Rhone delta. In Great Britain the development was along similar lines, but after a few decades most of the canals lost their significance because of rail-

road transportation. The only large British canal, the Manchester Ship Canal, makes Manchester a seaport. (For French canals see A352.)

In Holland (A336) more than in any other country inland water transportation still continues to be highly important. The North Sea Canal gives Amsterdam a direct outlet to the North Sea; another canal, which also crosses the dunes along the seacoast, makes the Hook of Holland the outlet of the Rhine and the outer port of Rotterdam. Belgium has also built a canal system connecting the distributaries of the Schelde in its delta with the Meuse and the rivers of northern France. In Germany (A469) the development of canals began later than in the Low Countries and is not yet completed. West to east canals, except for a small missing link between the Weser and Elbe, connect all the rivers from the Rhine to the Vistula. The Rhine-Ems Canal was intended to divert the Rhine traffic through Essen and Dortmund to Emden on the North Sea just east of Holland, but this attempt at a purely German route has not been very successful. Another canal between the Main and Danube rivers via Nürnberg gives an uninterrupted inland waterway between the North and Black seas, but this, too, is used only moderately. On the other hand, the Kiel Canal cutting off the Jutland Peninsula and providing a direct route between the North and Baltic seas ranks next to the Suez and Panama canals in the tonnage of its traffic, but cannot rival the inland waterways of the Rhine and the Sault Sainte Marie. Finally the many canals, mostly narrow, which interconnect all the Russian rivers will presumably culminate in the Don-Volga Canal giving the Volga River a direct outlet to the Black Sea.

Land Transportation. Railroads.—The demand for better transportation which began during the Industrial Revolution co-operated with the invention of power-driven machinery in causing the first line for steam locomotion to be constructed in 1825 between the English towns of Stockton and Darlington. This supposedly dangerous means of transportation met with general distrust and opposition, especially from the canal companies, which then enjoyed a virtual monopoly in England. Early progress was therefore slow though certain. Today, however, in the British lowlands it is hard to get beyond the sound of locomotives (A158). During the Second Empire and under Napoleon III the French railroad system began with a spider-like construction having Paris in the center. In Germany the first line began to operate in 1832 between Nürnberg and Fürth. Bismarck was the man who developed the state railway system to its present efficiency. Today these countries and their adjacent small neighbors have so dense a railway net that one needs a magnifying glass in order to

study it in A158. In other European countries the beginnings of railway development came likewise during the same period, but in A158 notice how difficulties due to relief on the one hand and climate on the other have retarded the building of railroads. The St. Gotthard Tunnel, 10 miles long, and constructed in 1882, was the first large tunnel. It opened a new era in railroad development. The Mont Cenis, Simplon, and Lötschberg tunnels followed suit in the Alps and two railroads have since crossed the Pyrenees.

In contrast to the dense railway net north of the Alps note the sparsity of railroads in the north, east and south of Europe. Even Italy, outside the Po Basin, has a railway net less dense than that of equally rugged parts of France, Germany, or Switzerland. Spain, the Balkan states, Russia, and the cool rugged parts of Scandinavia and even Scotland are conspicuously lacking in railroads. In fact the region with a dense railway net is almost identical with Europe A, while Europe C has relatively few railways even where it has a dense population. Even in the plain of Hungary in Europe B the net is less dense than in France and Germany. Belgium has the most elaborate railroad system of the world. If local lines are included, it has about 1 mile of track for every 2 square miles of area. The rest of Europe A generally has not far from 1 mile of track for every 5 square miles. Switzerland stands higher in this respect than its relief would lead one to expect, for it has built many mountain lines for tourists. The contrast between such countries and Europe C is very strong. Greece, for example, shows only one seventeenth of the railroad density of Belgium (A160).

The progress of transportation in Europe has led to constant changes and improvements. Many waterways are now used in conjunction with the railway system. Fast steamers connect Great Britain with the continent and Ireland. Ferries carry entire trains across the Baltic and join the railroad systems of Sweden and the larger Danish Islands with that of Germany. Speed and convenience have become so important that international trains make long runs crossing the continent in all directions. The Orient Express runs from Calais to Istanbul, via the Simplon Pass, Milan, and Belgradê, passing through seven countries. Electricity has replaced coal as a source of power in many mountain regions which are poor in coal but rich in waterpower. On the Swiss railroad system coal is practically eliminated, while electric power from plants using not only waterpower but also coal runs many trains in the Dutch and German lowlands. The competition of motor cars and buses has recently necessitated still higher efficiency, so that in some respects European railroads surpass

those of the United States. A train between London and Glasgow makes an 8-hour run at the rate of 70 miles an hour without stopping. In Germany radically new types of trains are tried out. There is still room for improvement, however. A tunnel under the Dover Channel would speed up transportation considerably; its construction is prevented by the fear of the British that their isolation will be ended, rather than by technical difficulties.

Modern Highways.—The transition from the wretched roads of former times to the smooth highways of today is seen mainly in Europe A. It is the work of not much more than a century. It began in France, where Napoleon, like the ancient Roman Emperors, saw the importance of good roads for merchants as well as for his armies. The famous *Routes Nationales* of France, paved with brick and lined with poplars, are in great part his work. England soon followed suit with good macadam highways. Germany did not do much before 1850. Today even the minor roads in these countries and their small neighbors are largely hard surfaced. Even in the remoter parts of Scandinavia and in Finland the main roads, though narrow and winding, have a surface of hard gravel. Elsewhere the building of roads has been much slower. Spain has a fine system of main roads between the large cities, but the rest of the roads are wretched. Italy has many admirable roads in the north, but few good ones in the south. Poland, Yugoslavia and Bulgaria have few hard roads, and dust, mud, or frozen ruts, according to the season, make travel very unpleasant.

Progress in such things as road-building is not likely to anticipate popular demand. An early demand arose because of the growing use of stage coaches as a means of travel. Bad roads often made the passengers extremely uncomfortable, and bruised passengers clamored for better highways. The coming of railways helped materially, for the increasing reliance on the main routes made necessary a system of roads connecting the rails with all parts of the hinterland. Market towns saw the necessity of bettering the surrounding roads to induce the rural population to drive their carts to the cities on market days. Increased security also helped to stimulate the use and improvement of roads. Holdups and robberies have gradually disappeared until they are limited to the remote corners of the Balkans.

At the end of the last century the bicycle did much to make good roads popular and to make people more critical about their condition. Even now, in some lowland countries like Holland and Denmark, it is still highly important. Nearly everyone in these two countries

rides a bicycle. This phase of transportation is one which Americans rarely understand. In the United States the bicycle created a great furor for two decades or so at the end of the last century, but was mainly a pleasure vehicle. Before it had found its place in the economic system the automobile had displaced it, leaving it as little more than a useful toy for children who are not old enough to drive cars. In Europe A the economic situation is such that the vast bulk of middle class and working people cannot afford motor cars but can afford bicycles. Moreover, the roads were already good before the bicycle was invented, and in large areas there were no hills. Hence the bicycle was very widely adopted as a means of going not only to school, but likewise to work and to market. All over Europe A the bicycle is far more common than in any part of the United States. In the flat, prosperous countries of Holland and Denmark one sees signs forbidding the parking of bicycles. In the rush hours these machines so throng the streets that the motorist must reduce his speed to theirs, and must stop whenever a cyclist, without looking back, holds out an arm indicating a desire to make a turn. In Europe C, on the contrary, bicycles are less numerous than in the United States. Instead of being ridden by children, they are the much-prized treasure of middle-class men who have laid by enough money to afford them.

The most marked change in the roads has of course come with the motor car. Motor traffic, to be sure, is a small matter in Europe compared with America. The whole continent, with four times the population of the United States, has only one fourth as many motor vehicles. Nevertheless motor traffic continues to increase steadily all over Europe, although the rate of increase is very slow in Europe C compared with Europe A. Passenger cars, heavy trucks, and, more recently, regular bus lines compete with the railroads, although in some places, as in France, the buses are run by the railroads. All this has contributed to an increase in the number of roads and to marked improvement in those already existing. The road system of Great Britain, for example, is considered to be in no way inferior to that of the United States. It is different, however, for huge trunk highways with four or six lanes of solid cement are rare in England, whereas the minor country roads with a gravel surface average much better than corresponding roads in the United States. On the other hand, Italy with much poorer roads than England on an average has built some splendid speedways in the Milan region.

Motor Transportation (A159).—The motor vehicles of Europe, as well as the roads, show differences from those of the United States.

One such difference appears in the fact that in the United States, aside from motorcycles, there is 1 motor vehicle for less than 5 people, whereas in Europe the number ranges from 1 for every 27 in France to only one for 2,800 in Russia. Another is that the percentage of the various types of motor vehicles differs greatly from country to country, and is nowhere the same as in the United States. For example, in Great Britain, in proportion to the population, passenger cars are only one eighth as numerous as in the United States. Moreover, a large percentage are much smaller and less powerful than here. Trucks are relatively one third as numerous as in the United States, and many are run by steam engines burning coal or crude oil. Motorcycles, on the other hand, are relatively 18 times as numerous as here—more numerous, in fact, than in any other country in proportion to the population. Such a situation, together with the numerous bicycles and the less pretentious highways, is in accord with the denser population and lower incomes of England as compared with the United States.

Passing eastward to Germany we find an accentuation of these same conditions. Passenger cars, relatively speaking, are only one twenty-fourth as numerous as in the United States, and trucks and buses one ninth. Both of these figures are only one third as great as in Great Britain. Motorcycles, on the other hand, are 14 times as numerous in proportion to the population as in the United States and almost as numerous as in England. Germany has about 55 per cent more motorcycles than passenger cars, because the country contains a great many people who can afford this cheapest form of motor traffic but cannot afford regular automobiles. Farther south-east in Hungary, a typical country of Europe B, we find only 1 passenger car for the same number of people who have 120 in the United States; 1 truck or bus where there would be 42 in America, and 3 motorcycles where the United States would have 2. Finally Bulgaria, in Europe C, has 1 of each kind of vehicle for the same number of people who in the United States would have 440 passenger cars, 145 trucks or buses, or 9 motorcycles. In Russia the figures are still more extreme, being approximately 10,000 for passenger cars, 80 for trucks, and 16 for motorcycles. This means that where the average Russian sees 1 passenger car the average Bulgarian sees about 25, the average Hungarian 100, the German 500, the Englishman 1,500, and the American 10,000. Where the Russian sees 1 truck or bus, the Bulgarian sees only half as many, but the Hungarian sees 2, the German 9, the Englishman 27, and the American 80.

In the Mediterranean portion of Europe C motor transportation is

more highly developed than in eastern Europe. Even there, however, the Greek, for example, sees 1 passenger car where the American sees 65, 1 truck or bus against 19 here, and 1 motorcycle against 8. All these data show a tendency for the cheapest form of motor transport, the motorcycle, to be introduced first; then the utilitarian forms in the shape of trucks and buses, and we might also add tractors—and lastly the luxury form in the shape of passenger cars.

Air Transport.—The air provides the newest medium of transportation. Although aerial freight traffic is still insignificant, air lines are doing a rapidly growing passenger business. In Europe Germany has the most lines, about 90 routes being now regularly served. The most active traffic along any one line, however, appears to be between London and Paris. If volume of traffic were shown on a map, the map would have the usual heavy shading around the North Sea and in Europe A, and light shading in Europe C. Extensions of the European air lines toward Asia and Australia (via India) are also in operation.

The airplane is the latest concession to the spirit of speed in transportation. We have seen this tendency in the history of ocean traffic; we have seen it in the development of railroads, roads, and motor cars; we see it once more in the progress of aerial transportation. Distances are shrinking, and the remotest corner of the world is brought within easy reach of Europe. One consequence will probably be an emphasized, worldwide spécialization of production, provided the artificial restrictions of tariff barriers are broken down. Rapid transportation has become an essential factor in the world's economic life, and its influence is likely to be even greater in the future than in the past. Nevertheless, to the geographer, the development of aerial transportation is of greatest interest as another illustration of the principle that new ideas and inventions produce their greatest results where the geographic environment fosters the concentration of the greatest activity. The airplane was hailed as a special blessing to out-of-the-way parts of the earth such as tropical plantations and remote mines. It is indeed of great value in such places, but the dweller in London, Paris, Amsterdam, or Berlin is the one who gets the most benefit from it.

CHAPTER XIII

RACIAL CHARACTERISTICS

Distribution of Racial Characteristics.—Three main races and several minor ones are recognized in Europe. In the later parts of this chapter the origin of each race, as well as the significance of each, is discussed. Here we shall briefly state the main characteristics of the three races and then discuss the distribution of these characteristics regardless of their racial application. The typical people of Mediterranean race in southern Europe have long narrow heads, short stature, slender figures, black hair, brown eyes, and an olive complexion. The Alpine people of the center of Europe have typically broad heads, medium stature, stocky figures, brown hair, gray eyes, and a pale complexion. The Nordics of the northwest are typically long-headed, tall, sturdily built, fair-haired, blue-eyed, and with light, rosy complexions.

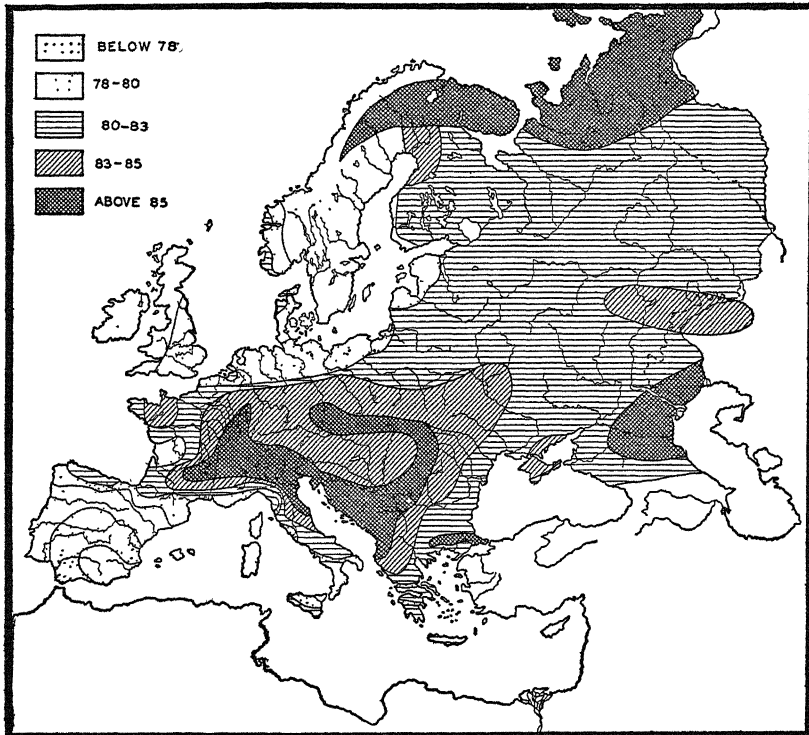
Head Form.—The distribution of the most important racial characteristics is shown in A171 (head form), A172 (complexion), and B172 (stature). The summary of racial characteristics which they supply is highly generalized. This is essential in part because the anthropologists themselves are by no means agreed as to what the primary races of Europe really are. If there ever were such races every one of them seems to have spread its influence to at least a slight extent into most parts of the continent. Moreover, because of constant migration on the one hand and the relative isolation of certain areas on the other, regions in close proximity may differ greatly in race. In spite of all this, however, each of the maps shows certain general characteristics which can be easily grasped.

In the generalized map of head form (A171) the areas occupied by people with long, narrow heads having an average cephalic index under 80 are confined to the southern and western borders of the continent. Beginning in the mountains of Greece, they form a more or less complete maritime rim all the way to the North Cape including the shores of the Baltic Sea.

Between the darker, smaller Mediterranean long-heads of the south and the fairer, taller Nordic long-heads of the northwest, stand the broad-headed Alpines and allied Asiatic races. The area of ex-

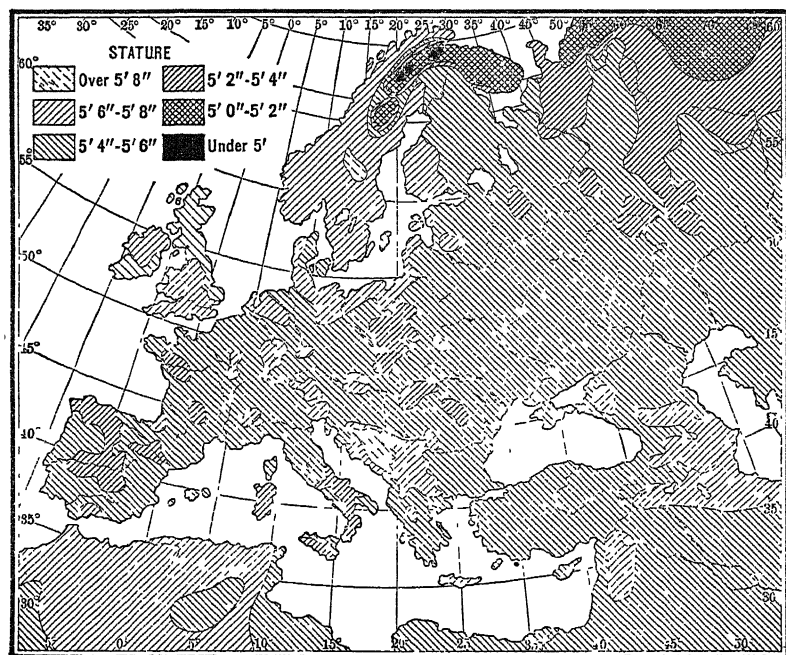
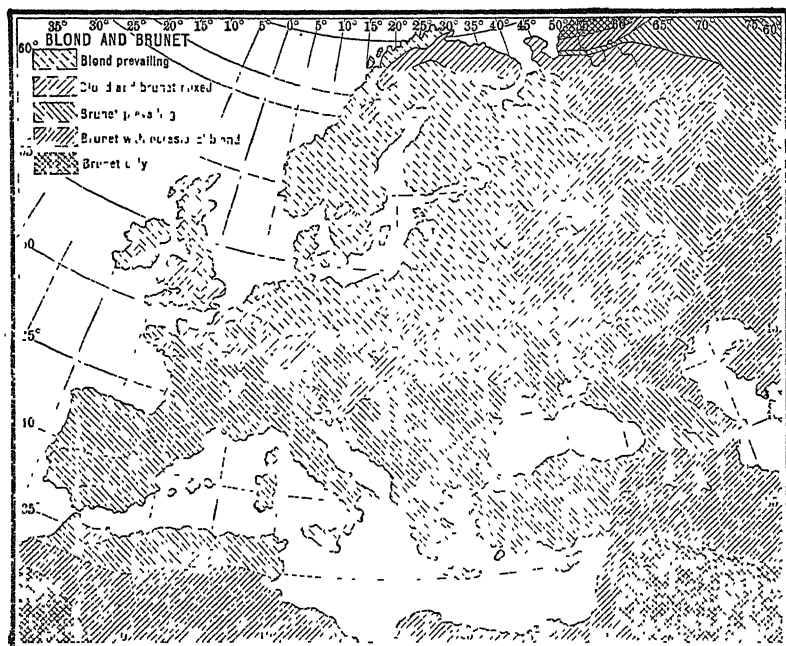
tremely broad-headed people in the north is of little importance, for it represents only a few Lapps, Samoyedes, and primitive Finno-Ugrian tribes whose numbers are insignificant. The rest of the area of broad-headed people with a cephalic index above 83 (the two darker shades in A171) is like a wedge thrust westward from central Asia across the center of Europe with its point in Brittany.

The highest cephalic index, especially in central Europe, is found among the Alpine people of mountainous districts such as the Alps,



A—Cephalic Index in Europe.

the plateau to the east of them, the Carpathian area, and the Dinaric System. Here a minor Dinaric group should be recognized. In cephalic index and in complexion this racial type is not much different from the true Alpines but in stature it rivals the tall Nordic race. This suggests an origin different from that of the true Alpines. As appears from their name the main home of the Dinaric people is the plateau east of the Adriatic Sea, but they can be recognized as far north as Germany where the tall, bearded Bavarians are excellent



Complexion (A) and Stature (B) in Europe.

representatives. Their origin must probably be sought in the Near East where the Armenians show similar racial characteristics. In eastern Europe the cephalic index does not tend to either extreme, but reflects perhaps the intermixture of the former long-headed population with the Slavic type of Alpine invaders.

Generalizing very broadly, as we must to get a bird's-eye view of the whole continent, we may say that the map of the cephalic index corresponds more or less to the shape of the great land mass of Eurasia and to its major features of relief. Omitting the minor details, which often obscure the great general facts, A171 seems to represent the final result of a long series of invasions by races with successively longer, higher, and broader heads. A few may have come from Africa, and some by way of Asia Minor, but the greatest migrations presumably came from Asia by way of the lowlands north of the Caspian Sea. As a result of all this the long-headed people have been pushed more and more to the coasts. There, however, an especially favorable geographical environment has helped them so much that they have made great progress and have again and again surged back against the invading broad-heads.

Complexion.—Turning now to A172 we see that the distribution of complexion is quite different from that of head form. In spite of much irregularity, due to incessant migration, there is a general shading off from darker types in the south and east to fairer types in the center and to very blond types in the northwest. There is a common idea that blondness is a sign of Nordic origin. This is probably a mistake. True Nordics are not only fair-haired and blue-eyed, but have rosy skins, tall slender figures, and very long heads with narrow faces. The East Baltic people, however, another race in Finland and northern Russia, are quite as blond as the Nordics, but their skins are less rosy, their stature much shorter, their figures broader and less graceful, and their heads quite round with broad faces. It is often supposed that the blondness of these broad-headed people of relatively recent origin is due to intermixture between a black-haired, brown-eyed Asiatic race and true Nordics. This is highly improbable because according to the Mendelian laws of inheritance dark hair and eyes are dominant over light ones. Therefore any racial mixture which would give a race with the strongly non-Nordic skulls and figures of the East Baltics would almost certainly also give dark hair and eyes. Accordingly, it seems probable that a similar mutation toward blondness has occurred in both a long-headed and a broad-headed race, and that this has been able

to survive because of the cloudy climate and prolonged winter nights of northern Europe.

Stature.—The complexity of the racial situation becomes still greater when stature, as well as head form and complexion, is taken into account. B172 shows that the Nordics and the Dinaric Alpine group agree in being tall, whereas the true Alpine people and the Mediterranean group are short. Around the North Sea and the Baltic the tall people prevail, while southern Italy and a large section of Spain show decidedly short stature which seems to be a racial characteristic.

When all three maps are taken into account—head form, complexion, and stature—we may say that aside from the broad-headed people in the far north the map of head form represents the distribution of successive groups of migrants under the influence of an impetus from Asia while the far north was still too cold to be habitable. The map of complexion, omitting once more the very small dark group in the far north, represents the effect of climate in selecting certain types of mutation for preservation in the northwest. The map of stature represents some factor which we do not yet understand. The exceptional dark people of the north appear to represent a recent intrusion of Asiatics into a region which was uninhabitable until a late stage of the post-glacial climatic changes. The immigrants here are broad-headed, dark and short, and have not suffered any apparent mutation since coming from Asia. In all these respects they are the opposites of their Nordic neighbors.

The distribution of stature, like that of head form, does not show any obvious agreement with geographic environment. This may be partly because we do not yet understand how stature is affected by such factors as the iodine which is given off in the spray of the sea, the scarcity of iron or other chemicals in sandstone or limestone, and a multitude of other peculiarities of diet and mode of life. Moreover, a large part of the effect of environment on all sorts of racial characteristics lies in the way in which plains, mountains, deserts, rivers, the fertility of the soil, changes of climate, and other environmental factors have influenced migrations. Some day such relationships will doubtless be clearly worked out, but at present our knowledge of them is scanty and chaotic.

The Meaning of Race.—Race is a biological term indicating major groups of people who share a common descent and hence display similar characteristics. These characteristics, so far as they are physical and not mental, may be internal features of the bony skeleton, or external features such as the color or quality of the hair, the color or form of the eye, the shade of the skin, and the shape of

the nose. The external characteristics are the more easily studied, for many of them are visible at first glance. Their simplicity accounts for the long-continued popularity of such a classification as the white, yellow, black, and red races. In recent years, however, students have become somewhat skeptical as to how far these external characteristics denote ancestry, for they are highly susceptible to change under the influence of geographical environment. Although complexion and climate by no means always agree, it seems clear that climate is of fundamental importance in causing dark-colored people to predominate in hot, sunny climates and fair-skinned people in lands that are cool and cloudy. In the same way, people with broad noses generally live in warm climates and those with narrow ones in cool climates, even though the two groups overlap or intermingle. Although it is hard to determine how far this particular trait is due to environment and how far to race, it is evident that geographic environment has so much effect on external traits that they are a poor guide in determining genuine biological relationships.

The internal features of the bony skeleton appear to be much less subject to environmental influences than are the external features. This causes them to retain a value as evidence of racial descent. The skull has an especial advantage in this respect because its ease of preservation facilitates the study of human remains from past ages. This makes it possible to compare the past with the present. Unfortunately, the correlation between head form and mental traits is slight, and no study of bodily traits has yet gone far in showing any relation between race and innate ability. The mental differences between closely related individuals, or between selected groups of people within a given race, are vastly greater than between any two living races as a whole.

Although many ways of measuring the skull have been used, one of them is of outstanding importance. This is the so-called cephalic index, which describes the shape of the skull in terms of the ratio between its breadth and length. Skulls with indices lower than 75 are called long-headed (dolichocephalic), those with indices between 75 and 80, medium-headed (mesocephalic), and those above 80, round-headed (brachycephalic). Some authorities, such as Dixon in *The Racial History of Man*, base the division of mankind not only on the cephalic index but on other measurements like the altitudinal index (the ratio between the length and the height of the skull) and the nasal index (the ratio between the breadth and height of the nasal aperture). In this book, however, only the cephalic index is used.

It is generally agreed that pure races, in the form of great groups of people showing the same physical characteristics and the same biological descent, no longer exist. The world is inhabited by all sorts of mixtures of such races. Hence the people ascribed to any given race are really highly diverse, and it is only by averaging together a great number of individuals, or by classifying them into types, that we gain a picture of the outstanding racial tendencies of the different groups.

The People of Early Europe. *The First Human Settlers.*—Of the earliest inhabitants of Europe we know deplorably little. The Heidelberg skull, found in Germany, and the Piltdown skull from England indicate a very primitive type of man with ape-like jaws and powerful physique. Respecting the next period we know a little more. Its Neanderthal race had very long heads and broad noses, not unlike the modern natives of Australia and Tasmania. Skulls found in various parts of western and southwestern Europe indicate that this race

spread over a considerable area. An extension of their habitat toward the north was impossible then because the last of the great icesheets still covered that part of Europe.

The Cro-Magnon Race.—After the Ice Age the Neanderthal men were replaced by the tall Cro-Magnon race with large dolichocephalic skulls having a high cranial capacity. These large-brained people were highly talented, as we infer from the strong contrast between their culture and the very primitive culture of their predecessors. The wonderful paintings on the walls of caves which they used as dwellings in southern France and Spain are not only interesting from the point of view of art, but tell us a great deal about their life and environment. Despite their high standing in art, these early people were still very primitive according to our standards. They had not learned to use metals, and employed only stone, bone, and wood for their simple weapons and implements. They lived as hunters, for agriculture and the use of domestic animals were still unknown. It is probable that they spread over much of Europe, and that some of the modern dolichocephalic skulls found in widely separated parts of the continent represent throwbacks to their type. In the western part of the Central Plateau of southern France, the present population still shows distinct Cro-Magnon characteristics.

Migrating Intruders. 1. *The Mediterranean Race.*—Although the Cro-Magnon race was long dominant, it finally succumbed to newer, stronger races with higher cultural standards. As far back as we can trace these new comers they show the three main racial divisions which have been described above—the Mediterranean race in the south, the Alpine race in the center, and the Nordic in the north. Among these the Nordics appear to be the youngest, the least numerous, and the most clearly defined. The Mediterranean race is also quite sharply defined in its physical characteristics, but there is some tendency for anthropologists to split off from it an eastern Semitic branch including the Jews and the Arabs. The Alpine race, on the other hand, is not clearly defined.

The Mediterranean race was the first of the three main racial groups to reach Europe, probably from northern Africa, although it may have come from Asia. These people—characterized by long heads, medium stature, and dark hair and eyes—spread over the whole Mediterranean basin, and extended through France into the British Isles and even into Scandinavia. They brought bronze, a new step in the development of culture, and built great stone monuments in France and Great Britain. Their long history is full of remarkable events, such as their being driven out of much of France and Great Britain as the result of the advance of the Alpines. The rise of Greece and Rome may have been aided by Alpine and Nordic influences, but it was apparently in considerable measure the work of people of Mediterranean race. The decay of the Roman Empire under the pressure of Alpine, Nordic, and even Mongolian invasions seems to suggest a decline in the power of the Mediterranean type, but in spite of all invasions, in spite of all historical changes, the Mediterranean race not only still exists, but is also highly powerful. Southern Europe, comprising Spain, the coastal zone of southern France, the Italian peninsula, Sardinia, Corsica, southern Greece, and Crete, is still almost wholly occupied by Mediterranean people, a race of marvelous vitality. Elsewhere their racial influence has appreciably modified other races in large sections of Europe, especially Ireland, Wales, and north-western Scotland.

2. *The Alpine Race.*—The Alpine race came from Asia. Its members were broad-headed people (mesocephalic to brachycephalic) of stocky build and short stature with dark hair and dark to grayish eyes. They came in successive waves along the north side of the mountains that run east and west across Europe. Thus they penetrated to the Balkans, the Danube Valley, and the Alps, but were long separated by the mountains from the Mediterranean race. The two races met, however, in places like the eastern Po Valley and France, which are easily reached both from central Europe and the Mediterranean Sea. The lake dwellings found in Switzerland probably represent an early Alpine migration.

Later waves followed, and the Alpine influence finally reached as far as Spain, Brittany, the British Isles, and Norway. Along the northern coast of Spain, the high cephalic index still indicates Alpine influence if we use that word in its broader sense. The same is true of the western coast of Norway near Bergen. In the British Isles the influence of the Alpines was perhaps more cultural than racial. At any rate the Celtic languages in Ireland, Scotland, Wales, and likewise Brittany are modern relics of that race, although the people tend to be of the Mediterranean type physically. Today the greatest body of Alpine people is the Slavs who comprise a large share of the Russians and of the people of the Balkans.

3. *The Nordic Race.*—The third of the great races of Europe is the Nordic, represented by tall people with long heads, fair hair, and blue eyes. Their place of origin is not yet definitely known. We only know that their ancestors must have come from south or east of the present Nordic center in Scandinavia, for the region of their supposed European origin was uninhabitable during periods of extreme glaciation. The Nordics are usually said to be a purely European type, which means that they have developed their physical characteristics and their civilization within the confines of Europe. Not only do we find these people mainly in northern Europe today, but historic records show that from there they have pushed toward the south, the west, and even the east. It is sometimes held that in earlier times Nordic people reached Greece and formed a blond aristocracy whose memory is perpetuated in numerous painted statues with yellow hair and blue eyes. A later body of Nordics, the Russ, migrated eastward from Scandinavia to central Russia and gave their name to that country. A late and well-known Nordic migration was that of the Norsemen or Vikings. They followed the coast of Europe southward from Norway far into the Mediterranean Basin leaving their name in Normandy and their people in many other places, especially the British Isles. They also crossed the Atlantic and settled in Iceland.

In spite of this southward and westward movement the attempts of the Nordics to move eastward were never very successful. Swedish influence did indeed penetrate to Finland, west Russia, and the Baltic states, and German influence to Poland, Lithuania, and Latvia. But these were minor events of scarcely more than passing importance. The Slavs had filled the open spaces in the east, and occupied the whole area east of the Elbe River so fully that there was little room for Nordics. The outcome of the World War served to show once more that the Nordic advance toward the east is blocked by these same Slavs.

Asiatics Among the Slavs.—In addition to the three races described above another racial group claims our attention. It consists of broad-headed Asiatic

tribes which have forced their way into Europe from the east. Although allied to the Alpines in head form, these tribes are not Alpines in the stricter sense of the word. Russia, the greatest of the present Slavic areas, is physically exposed to migrations from Asia. So invaders have pressed in partly through the gate between the Caspian Sea and the Urals, and partly both farther south and farther north. Like the earlier Asiatic migrations of Magyars and Bulgars the invading tribes themselves—Huns and, later, Tartars in the center, Turks farther south, and Samoyedes in the far north—were not very important in their influence upon the racial composition of Europe as a whole.

The Origin of the Nordics.—An interesting and perhaps important sidelight on the origin of races is cast by domestic animals, especially horses. Among biologists it is universally recognized that man shows the typical characteristics of a domestic animal. It may, then, be significant that the horse has developed a blond type in the same region where blondness is most pronounced among men. In central Finland, for example, a count of the horses shows that 80 or 90 per cent are of a small and thoroughly blond type with cream-colored bodies and flaxen manes and tails of the same tow color as the hair of the Finnish children. Coming toward the south coast the percentage of blondness diminishes, and every sort of combination between the more common darker types of horses and the blond type is seen. Blondness still predominates on the coast, but larger and darker types are especially numerous near the cities. In Sweden and Norway a similar condition prevails. In the country districts of central Norway blond horses are very common, but in Oslo they are relatively scarce, since southern types have been freely introduced. In Denmark, once more, the blond type is more common in the west than around Copenhagen, although it is seen everywhere. It is larger here than farther north. Going farther south to Holland and England the blond types are still seen. In many places 10 per cent of the horses have manes and tails lighter than their bodies, but the pure cream-colored type is rare. Still farther south blondness almost disappears among the horses. Although no exact studies of this matter have yet been made on a large scale, it is evident that the distribution of blondness in horses is similar to that in man. It is most pronounced in certain northern centers; it is interrupted irregularly as the result of migration; and in a general way it diminishes from the central northern area outward. A similar condition appears to prevail among a pale variety of hornless cow indigenous to Finland.

The likelihood that the environment of northern Europe has caused blond mutations in both man and other domestic animals is increased by a very exact study of Nordic traits made by the Swedish Institute for Race Biology under Professor H. Lundborg. This shows that Nordic traits are very strongly concentrated in central Sweden and southern Norway and decrease as one goes away from these regions except where an almost pure Nordic stock has migrated outward and has not mingled with other races, as in Iceland and along the coast of west Norway. In the case of horses we are almost sure that the blond variety originated not far from the place where it is now most dominant. If the same is true of man it suggests that the blond Nordic race originated in Scandinavia, and that the environment there is still such as to make this general region the most favorable Nordic area. The presence of the blond East Baltics farther east suggests that there, too, a mutation occurred so that a broad-headed and relatively short race also became blond.

As yet, we cannot be certain about any theory of racial origin. Nevertheless, it is highly suggestive to think of central Asia as a region where changes in head form have been especially significant, and where successive races have tended to be more and more brachycephalic. Moving outward in a response not only to the growth of population but also to changes in climate, they have followed the lines laid down by the relief of the land and by bodies of water. In coming to Europe they have shoved one another aside, interpenetrated, and mixed. Yet to a certain degree they still preserve their identity so that the older, long-headed types are on the margin of Europe and the younger, broad-headed types in the center. As one race or another has reached a new environment, however, its complexion, stature, and figure have presumably suffered radical changes even though the old head form persists. In Europe the most radical change has been the evolution of blondness among two distinct races in the peculiar climate of the continental northwest.

CHAPTER XIV

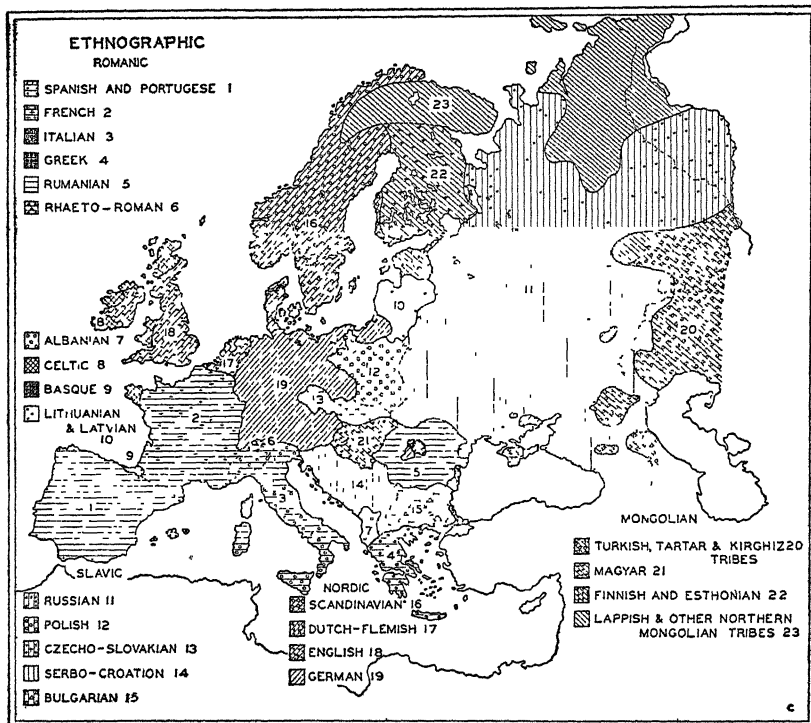
ETHNOGRAPHIC DIVISIONS AND NATIONS

Ethnography.—In actual practice ethnographic units are much more important than the purely racial or biological units discussed in the preceding chapter. Ethnographic units are groups of people bound together by social, cultural, and linguistic ties. Of course the racial factor is not to be neglected, but various other considerations deprive it of primary importance.

The greater part of the European peoples (the word *people* being used for an ethnographic unit) are not of one race, but have been developed through repeated intermixture. Their languages, which form perhaps the most common ethnographic base, are in many instances not those of the strongest racial factor in the population. A country often speaks the tongue of some little group of conquerors who, though small in numbers and therefore weak in biological influence, have held political power sufficient to force their speech upon the conquered population. Thus in time the conquered have become fused with the conquerors as an ethnographic unit. Sometimes, too, the contrary has been the case, and the conquered population, on account of its higher cultural standing, has possessed sufficient vitality to assimilate the invaders. A181 is an attempt to classify the countries and regions of Europe into ethnographic units corresponding as nearly as possible to the racial divisions, but it is apparent that ethnographic influences everywhere overlap the racial boundaries.

The Romance Peoples and the Greeks (1-6 in A181).—The Mediterranean peoples are called Romance because they occupy the part of southern and southwestern Europe that was subject to the political and social influences of the Roman Empire. In A181 the Iberian Peninsula is shown as a single Romance unit because the difference between the Spanish and Portuguese is distinctly more political than ethnographic. Italy is occupied by people who are in part the direct descendants of the old Romans. Although the Greeks do not speak a Romance language, they are included here because they have much in common with the Italians in customs and culture, partly, no doubt, because of their common geographical environment. Despite repeated incursions of other races and consequent racial admixtures, notably

in northern Italy, both the Greeks and especially the Italians have been vital enough to assimilate invaders and hence have retained their identity through all the centuries. France belongs ethnographically although not racially to the Romance group. Out of the ultimate mixture of races (see map of cephalic indices, A171) came a strong ethnographic unit, marked by its Romance language, and extending even into southern Belgium and western Switzerland. Only in the far western section do relics of Celtic language in Brittany still show



A—Ethnographic Divisions of Europe.

signs of a former Alpine racial influence, as they do west of the Nordics in Great Britain and Ireland (8 in A181).

Rumania forms an isolated eastern unit belonging linguistically to the Romance group, but is composed of Slavic people whose language is much more Roman than is their civilization. It is probable that the Romance influence did not come direct from Rome, but from Byzantium, the eastern Roman Empire of the Middle Ages. Moreover, at present the Romance cultural touch is seen mainly in small urban

groups of people as in Bucharest, rather than in the cultural and social conditions of the rural population who are peasants with habits much like those of other Slavic regions. The little enclave of Hungarian and German population found within Rumania on the plateau of Siebenburgen in Transylvania is due to arbitrary colonization.

The Basques (9).—Another enclave within Romance territory is formed by the Basques. This small ethnographic group lives on both sides of the Pyrenees near the Bay of Biscay. The Basques have long mystified anthropologists. They differ from all other peoples of Europe in facial features, domestic customs, and language. On the map of cephalic indices (A171) they do not show up well, probably owing to intermixture with the peoples that surround them. This is a good illustration of the fact that language and customs have far more effect than racial traits in giving a people its distinctive character. The Basques seem to represent a relic of some former population, preserved by the rough, inaccessible mountains in which they live. They still use a language long extinct elsewhere in Europe, but dating perhaps from a time when it prevailed widely.

Nordic Peoples (16-19).—In general the distribution of Nordic peoples seems to coincide very well with the area covered by the Nordic race. An exception exists in the British Isles, where the western mountain areas are still occupied by a scanty population whose Celtic language is a relic of Alpine occupation. Curiously enough, these people of Wales and northwestern Scotland are Mediterranean in race, and have now become largely Nordic in culture, so that their old Alpine language makes them represent a combination of all three races. In central, southeastern, and southwestern Germany, Austria, and northern Switzerland, the Nordic ethnographic influences overlap a large area which is racially Alpine, as in Bavaria. Political influences have been very important in bringing this about, and the German language and culture bind together a population of extremely varied origin, which is now commonly called Aryan in Germany. The different Nordic languages are much alike, and show clearly enough their common source. Persons talking Swedish, Norwegian, and Danish can mutually understand one another. Dutch and the allied Flemish dialect of Belgium are closely allied to German and not greatly different from the Scandinavian tongues. English is different from the others because it contains a large Romance element brought by the Normans who themselves had given up the Norse language for that of France.

Slavic Peoples (11-15).—The third great ethnographic group in Europe is here called Slavic rather than Alpine. This is because there

is no very marked western extension of the Alpine race in an ethnographic sense. Even in the Alps there is no such thing as an Alpine language or an Alpine culture apart from that of the Romance and Nordic neighbors. On the other hand the Slavs, with their distinct language and culture, form a very strong ethnographic group. The Slavic group has two branches separated by the Hungarian and Rumanian units. The Russians, Poles, and Czechoslovakians comprise the northern Slavic branch; and the Bulgarians, Serbians, and Croatsians comprise the southern. The Slavic culture essentially coincides with the distribution of the Slavic race except in Rumania which has been discussed above. The Dinaric racial group cannot be clearly recognized from an ethnographic point of view and seems to be absorbed by its neighbors.

Albania (7) may be considered a part of the southern Slavic group, despite some ethnographic differences. The Lithuanian and Latvian units (10) have been so greatly influenced from all directions that their relation to the other groups is highly speculative. Russian Slavs have ruled them, a German aristocracy has owned much of the land, and Swedes have been an important element.

Asiatic Peoples (20-23).—The fourth group shown in A181 is Mongolian. It might perhaps better be called Asiatic, except that the Alpine race also came from Asia. The Finns and the related Estonians form a special ethnographic unit with a distinct type of language. Their cultural development, especially in Finland, has been greatly influenced by the Swedes, who occupy the Baltic coastal zone and still retain their own language. Since the World War there has been a strong tendency to minimize Swedish influence and to exalt the Finnish language and culture.

The Magyars of Hungary, though they have been materially affected in a racial sense by the surrounding Slavs, still represent a distinct ethnographic unit, differing from their neighbors in language and in social and cultural characteristics.

The Lapps and other Mongolian tribes of very primitive cultural development occupy northern and northeastern Russia. The areas along the Ural Mountains and the Caspian Sea, together with much of the Crimea and Dobruja, are occupied by Turkish, Tartar, and Kirghiz populations which still retain their own languages and customs. One of the best authorities speaks of the Turks as still nomadic at heart although they have been settled for centuries.

Religious Alignments.—The religions of Europe are almost as effective as the languages in producing ethnographic differences. Three forms of Christianity are outstanding, and there are also various

forms of lesser importance. The Roman Catholic form has as its sphere of influence Italy, Spain and Portugal, France, Belgium, the southern part of Holland, Ireland, parts of Switzerland, parts of western Germany, southern Germany, Poland, Lithuania, Austria, Czechoslovakia, Croatia, and Hungary. Its adherents in these countries number about 180 million. Its areal extent generally depends upon political rather than racial or ethnographic boundaries.

The Protestant forms of Christianity, with about 100 million adherents, predominate in the countries around the Baltic and North seas. They occupy much the same area as the Nordic race, and extend into southwestern Germany and Switzerland. The Finns, Estonians, and Latvians belong also to this group, which is almost wholly northern.

Eastern and southeastern Europe were formerly the seat of the Greek Orthodox Church. This church originated in Byzantium, the capital of the Eastern Roman Empire. It still claims a membership of many millions in the Balkan region from the Danube southward. It formerly included practically all of the Russians. The Soviet government, however, has broken the power of the Greek church in what formerly was Russia, and church buildings have been destroyed or devoted to other uses. One may almost say that in Russia a new religion in the form of service to the state has arisen with Lenin as its adored apostle. The Protestant sects of Russia have clung to their faith longer than have the members of the Greek church, but they are not numerous and have now lost most of their power.

In the Balkans, as a result of Turkish political domination, the Mohammedan religion is found here and there. This is true even in areas where the population is Slavic, as in parts of Bosnia, Albania, Dobruja, and Bulgaria. The tribes of southeastern Russia also still hold to Mohammedanism, although how long this will last in the face of Russian opposition is still doubtful. The number of Mohammedans, however, is too small to be of much importance. The Protestantism of northwestern Europe, the Roman Catholicism of the center and south, and the godlessness of the east are the three really powerful divisions of Europe on the basis of religion.

Nations.—When ethnographic units not only have the same customs, culture, and language, and perhaps the same traditions and historical development, but at the same time strongly desire to exist as independent political units, they are called nationalities. When this desire is satisfied and an ethnographic unit becomes a political unit with political boundaries, it constitutes a nation. From this it seems to follow that an ideal nation should be a perfect ethnographic unit,

but this ideal is rarely realized. On the contrary, some ethnographic differences nearly always exist within a nation. This does not necessarily impair its strength. Indeed, many people think that a certain amount of ethnographic tension or stress is a stimulus to economic and cultural development, which may be handicapped by too great uniformity.

An example is France where the southern and northern parts differ distinctly, without affecting the unity of the French nation. Sometimes very different ethnographic units may merge to form a strong political unit, as in Switzerland. There four ethnographic groups (German, French, Italian, and Rhaetian), despite differences in customs, culture, and language, are closely bound by strong democratic principles and have achieved a marked national unity.

The very complicated mixture of races and ethnographic groups in Europe makes it impossible to form states based entirely on the principle of self-determination, that is, on the principle of allowing every ethnographic unit to choose its own political relationship. Despite the general post-war acceptance of Woodrow Wilson's proposals in this respect, natural boundaries and economic requirements had of necessity to be taken into account when the World War was liquidated. If they had been neglected the new-born states might have been throttled at the outset. Such considerations in many cases made it necessary to include minorities under the control of larger ethnic groups with whom they were not always in sympathy. But even in the face of strong and sometimes unwise political influences on the arrangement of national boundaries after the war, the results are fairly satisfactory from a neutral point of view, notwithstanding the great number of problems that still remain unsolved.

The Ethnographic and Political Conflict.—In Europe the principle of nationality assumes an importance which is often puzzling to Americans. It was the cause of wars long before Wilson set forth the doctrine of the right to self-determination, and it is still a great source of trouble. In many regions part of the people wish to belong to some other political unit, and often a strong minority holds ill feelings towards the rest of a nation. The cause of this desire may originally have been racial or ethnographical in character, as when migration or colonization brought groups of people into a new environment and resulted in their losing touch with their original habitat. A good example is the German or Saxon population in the Transylvanian Basin. Brought there as colonists, several centuries ago, they lost all political contact with their own ethnographical group, and were ruled first by the Magyars, during the time of the Austro-

Hungarian Empire, and, since the war, by the Rumanians, who entirely encircle them. Nevertheless, they still show many German characteristics. Their cities, though now Rumanian in name (like Brasov, instead of Kronstadt), are still typically German; their newspapers, printed in German, still fight for ethnographical recognition from the Rumanian government. Such ethnographical islands, however, are comparatively few.

Zones of Transition.—The greatest source of friction between ethnographic and political conditions is found in zones of transition between ethnographical groups. In fact such friction can scarcely be avoided except where geographical factors, such as sharply defined mountain ranges, make the contact a precise line. Elsewhere the ethnographic transition is frequently gradual, and an eternal boundary struggle between the two adjoining nations is often the result. The right of might is often the factor which determines the location of a boundary; but even neutral experts cannot always decide where, in accordance with justice, a boundary should be. Americans often find it hard to appreciate this, because their situation is so different from that of Europe. On the Canadian border there is no friction because ethnographically the people on the two sides are practically the same. At the Mexican border, on the contrary, the ethnographic transition is so sharp that there is little difficulty. Nevertheless, even under such favorable conditions, the presence of Mexicans in the United States and of Americans across the border in Mexico creates considerable friction locally. In Europe this sort of thing is magnified a hundred fold.

The European situation is still further complicated by the fact that the people in a transition zone often feel themselves to be different from both of the two adjoining nations. Hence they become an automatically separate ethnographical group, which may even develop into a nationality. The change of such a nationality into a nation is sometimes the only solution; but within such a nation the factor of transition again brings forward ethnographical differences which result in political troubles. Belgium is a typical example of this. At the meeting point of the Germanized and Latinized sections of the European world, it was often a part of France, often connected with Holland, but finally, after 1830, a nation by itself. Constant political jealousy still continues between the Walloons, the French-speaking minority with a dominant influence in the government, and the Flemish Dutch-speaking majority with fewer ethnographical rights. A more friendly feeling between these two would be of great value to the country, for, as an ethnographical buffer nation, Belgium has an

important place among European countries, if only she can find a definite solution for her internal problems.

A very happy example of a transitional country is Switzerland. At the trifurcation of the German, French, and Italian people, and containing also remnants of a fourth group (the Rhaeto-Roman), the country is the logical result of free democratic co-operation. No ethnographical section in it endeavors to dominate any of the other sections, and the Swiss Republic is the world's finest example of how genuine freedom can weld diverse ethnographic elements into an almost perfect nation. Even a geographical barrier like the Alps is of minor importance, and it is through the desire of the native population that the Swiss Republic extends geographically into the lowlands of northern Italy.

Although Switzerland and, in a way, Belgium also have solved their transition problems, they are exceptions, for Europe is a hotbed of similar political problems still unsolved. The Macedonian puzzle of Greeks, Albanians, Serbs, and Bulgarians, complicated by Turkish intermixture, still remains the chief danger in the already politically dangerous Balkan Peninsula. The internal political disagreements between Macedonian fugitives and the people around them are still further complicated, rather than solved, by bombs and frequent raids into Yugoslavian territory. There, as late as twelve or fifteen years after the World War, the railroads near the Bulgarian border still had to be defended by armed soldiers. Such things are no foundation for the political peace and co-operation which repeated Balkan conferences are trying to establish, but they are the natural result of the rugged and diverse topography, the chaos of races, and the great ethnographic diversity.

The Boundary Problems of Germany.—The country which faces the problem of ethnographic transition most directly is Germany, which lost the transition zones when it lost the war. The unrest and political agitation which have thus arisen are especially important because in many respects Germany is still Europe's strongest nation. In the north, the transition between Denmark and Germany takes place in Schleswig-Holstein, on the Jutland Peninsula. Very rightly, the Peace Treaty of Versailles gave this section a referendum; and the northern part of Schleswig, conquered by Prussia and Austria in 1864, chose to return to Denmark, a solution which looked very satisfactory, since it accorded with the principle of self-determination. An economic factor upset the hopes of the people, however, for Schleswig, notwithstanding its political aspirations and the protests of its members in the Reichstag, had become a part of Germany's great economic

order. Germany, which it disliked so much, had become the principal market for its products. When freed from Germany, it inevitably lost this market, and the adjustment to new markets was not easy, because Denmark, since its separation from Schleswig, had gone other economic ways. The result was again discontent, and the theoretically ideal new boundary laid down after the war was no longer advantageous.

The boundary between Germany and Holland is aged by centuries and has become typical of the kind between groups entirely different ethnographically in spite of racial kinship. Likewise, except in time of actual war, the boundary between Germany and Belgium gives little trouble, as it runs along a poor upland with a sparse population. The rather small changes made in it after the War are probably only temporary, since they were born of war rather than of national desire.

Alsace-Lorraine is Europe's classical example of transitional trouble.—The population is still, for the most part, German; it speaks a German dialect, and its cities and villages show German characteristics. But against their German background is seen a French spirit of culture, which makes the people different from their German neighbors on the Rhine. In the Middle Ages this problem was solved by the existence of the state of Burgundy, which extended from Switzerland to the North Sea as a buffer between France and Germany, but that state lacked national strength. Since its breakdown, Alsace-Lorraine has been the subject of constant disagreement between France and Germany. Whenever it belonged to Germany, the French spirit was not recognized, a situation especially true before the World War, when the Prussian military attitude caused deep resentment. Whenever it belonged to France, as now, it lacked economic contact with the adjoining sections of the Rhine Valley, and the German side of its character was disregarded. Autonomy would be advisable if it could be brought about in a practical way. At present, with the boundary pushed back to the Rhine, the situation is not recognized by many Germans as final, and the eyes of Germany look across the Rhine to the great towers of the Cathedral of Strasbourg as symbolic of German ground.

✓ The Swiss like the Dutch boundary of Germany is based upon historic traditions, and even its ludicrous shape, with offshoots toward the north and south, does not seem to cause any political stress. The Austrian boundary would never have existed if the peace treaty had not forbidden Austria to join Germany, and we have here the unique example of an independent country created against its own wishes.

This boundary also furnishes an example of the instability of ethnographic aspirations, for in 1933 the Austrians, temporarily at least, changed their minds and did not wish to join the Germany of Hitler. The boundary between Germany and Czechoslovakia is fixed by nature, for a sharp and heavily forested range of mountains surrounds the Bohemian plateau, and the Germans beyond the mountains have to reconcile themselves to Czechoslovakian rule.

The eastern frontier of Germany is the worst source of trouble, for there again is a zone of transition. The background here is even more complex than that of Alsace-Lorraine, and its origin is to be found only in remote history. During the break-up of the Roman Empire, there was a tendency for the Nordic tribes to move westward and southward. They invaded France and went as far as Sicily and northern Africa. They colonized Great Britain and crossed the Atlantic, even to Greenland and North America. The result of this westward drift was that they eventually vacated all the territory east of the Elbe River; and from across the Carpathian Mountains Slavic tribes moved in and occupied the land. Then during the Middle Ages the Nordic tribes, checked in their westward advance, moved eastward again, recrossed the Elbe, and by settling there and outnumbering the Slavic inhabitants gradually brought again under German control the land which they had formerly occupied. Further eastward, across the Oder, the returning Germans encountered resistance. Politically successful along the Baltic shore in East Prussia and in the Baltic states and southward into Silesia, they never outnumbered the Slavic Poles in the region between the Elbe and the Vistula. Thus, although responsible for rapid economic progress, they remained only as a ruling minority in what is now western Poland. Organized resistance of the Poles prevented this section from being Germanized; and recently, after the World War, when Poland was reborn, the boundary—which more or less represents the ethnographical situation—was so placed as to give Poland great sections which were developed by German energy and German money. The result is hatred between these two nations.

The tension between Germany and Poland is especially acute at the two ends of the transition zone along the Polish Corridor and in Upper Silesia. These two regions are complicated not only by ethnographic but also by important economic considerations. Of course, these are also behind many other boundary disputes, but elsewhere on the German frontier the transitional character of the disputed zones has been the dominant factor, whereas in the cases now to be discussed the economic factor is outstanding.

The Polish Corridor seems to many people to present a politically impossible situation, because it separates East Prussia from the rest of Germany. Even the claims of an existing Polish majority along the lower Vistula within the Corridor can scarcely be considered strong enough to defend its creation. Yet it has been maintained because Poland requires a free outlet to the sea. Likewise, the harbor of Danzig, entirely German in construction and sympathy, was neutralized and brought under the control of the League of Nations in order to serve Poland. Even as a neutral harbor, however, Danzig had disadvantages for Poland, which became very evident soon after the World War when the city forbade the Poles to land war material during the advance of the Russian army toward Warsaw. This made it necessary to create the Polish harbor of Gdynia, which is now connected by direct railroads with the hinterland and seems destined to become the main Polish outlet. The feeling in Germany against having its territory broken in two by such a strip of Poland can be easily understood, and the situation will remain a source of danger unless it is taken care of in a way that is acceptable to both sides.

Upper Silesia looks like a problem of ethnographical boundaries involving the Germans, the Poles, and the Czechoslovakians, but the very valuable Silesian coalmines are also involved. As it now stands, the boundary divides the coal areas into three parts, thus breaking up a former economic unit. Although a temporary agreement between the different parts has been made, other steps will have to be taken to prevent this area from being a perpetual source of friction. Thus at each of the four corners and along much of the remainder of the east boundary Germany is beset with political trouble because of transitional ethnographic zones and their economic complications.

The Combination of Ethnographic Units. *Czechoslovakia.*—Another cause of Europe's political troubles is the conflict between ethnographical principles and the compelling force of geographical circumstances. Upper Silesia, as we have just seen, illustrates this because it is geographically a unit but is politically divided because diverse ethnographic types happen to live there. Still more difficult conditions arise when several ethnographical groups have to be united in order to make fair-sized nations. This happens sometimes because different groups have much in common and sometimes because geographical conditions make it necessary. The second reason applies in Czechoslovakia and Yugoslavia.

Czechoslovakia, as the name indicates, is the combination of two groups, the Czechs or Bohemians and the Slovaks. The fact that both

of these are Slavic should make them well suited for co-operation, but in spite of racial conformity they have great differences, which came out strongly during the first years of the new state. The Czechs, surrounded by the Germans, were politically and culturally much influenced by them, but they kept their own political and religious aspirations, as is shown by the principles of their great leader, Huss. The Slovaks, on the contrary, were dominated by the Hungarians during so long a time, and to such a degree, that the spirit of ethnographical independence virtually left them, only reappearing as a factor in the breakdown of the Austro-Hungarian Empire. They were very different from the more liberal Czechs; and the domination of the Czech spirit in the new state made conditions so bad that a break would certainly have occurred if it had not been for the great leadership of President Masaryk.

Besides these two main groups there are three minorities in Czechoslovakia. All along the borders of the Bohemian Plateau there are Germans who had to be included in the new state because it was politically desirable that the mountains surrounding the basin of the Bohemian Plateau should form the national boundary. Having once been the rulers, the Germans have resigned themselves only with great difficulty to being ruled. In the south Czechoslovakia extends to the Danube in order to give the country an outlet by water. Most of the people here are Hungarians, from whom deep national sympathies for Czechoslovakia cannot be expected. The eastern extension of the country includes the Ruthenians, a part of the great Ukrainian group which also populates Galicia, northern Rumania, and southwestern Russia. Everywhere there is ethnographical discord; and Czechoslovakia, the most well established and prosperous of the new states and the one with the best geographical foundation, still has great trouble in keeping its house in order.

Yugoslavian Diversity. Yugoslavia is in a similar situation. Here groups of the south Slavic race were brought together to form the new state. On the one hand are the Serbs, the old Balkan fighters, still primitive in many ways but ardently devoted to their country, with their fighting spirit as alive as ever. Influenced by Russia, using Russian script and adhering to the old Russian church, they represent eastern Europe. On the other hand, belonging to the same race, but influenced for centuries by Austria, are the Croatians of the northwest, progressive and culturally superior, looking down upon the primitive Serbs. Although these two had to combine in order to make Yugoslavia possible, internal discord has brought the combination to the verge of collapse. Add to these a million Slovenes,

half a million each of Germans, Hungarians, and Albanians, and a quarter of a million Rumanians, not to mention the Macedonians, and the complexity of the ethnographic situation is evident. The tie that now keeps Yugoslavia together is chiefly the fear of a common foreign danger. Such association of discordant ethnographic units is as bad as the transition zones in preserving in Europe the germs of war. Even a small outbreak may grow to continental proportions.

CHAPTER XV

THE DISTRIBUTION OF POPULATION

Remnants of Nomadism.—The distribution of pastoral nomads illustrates a very important geographic principle—namely, that primitive modes of life survive only where nature offers very limited possibilities. In some regions, such as parts of the coast of far northeastern Russia, almost the only resource upon which people can depend for a living appears to be fish and other animals, especially those of the sea. In others, like the coast of Yorkshire in northeastern England, this primitive mode of life is possible, but so is a pastoral life, agriculture of various kinds, lumbering, mining, manufacturing, and commerce. Thus in the Russian region man's choice of modes of life is extremely limited, and his opportunities to rise in the scale of civilization are slight. Yorkshire, on the contrary, offers a wide diversity of choices so that, as man gets new ideas and makes inventions and discoveries, he is continually encouraged by new opportunities which he had not hitherto appreciated. Thus he is stimulated to develop higher forms of civilization. To the geographer all this is of deep interest because he sees that in the world as a whole low forms of human culture, like the hunting stage or pastoral nomadism, persist only where the physical environment either fails to offer other opportunities, as in some deserts, or offers them only at a price which even the most civilized people cannot yet pay, as in certain tropical rain forests. This explains why in Europe pastoral nomadism persists only among the Lapps and similar people in the far north and the Tartars and allied people in the excessively dry region around the Caspian Sea where agriculture is impossible. Their mode of life is no reflection upon the ability of these people. It simply means that in their environment the choice of how they shall get a living is extremely limited, and extensive pastoral stock-raising is the best method yet devised.

Because pastoral people must be widely scattered, the density of population is always low. In the grazing areas the pressure of overpopulation is especially likely to occur at frequent intervals because existence depends solely on whether the grass grows well or ill. This fact, joined with the mobility of nomads who dwell in tents, has been

a great cause of historic migrations and of many of the invasions of Europe which have been mentioned in previous pages. A large number of the migrants who gave rise to the various races of Europe appear to have been pastoral nomads. They came largely from Asia because the central and western parts of that continent are the sections of the world where semi-arid grasslands most strongly foster pastoral nomadism. Moreover, there, more than in most places, climatic fluctuations bring drought and distress and thus create pressure because of overpopulation.

Rural and Village Types of Distribution.—In the parts of Europe where the climate and soil were suitable, the art of agriculture developed long ago. This took place especially in subtropical or semi-arid regions. There rivers flooded their plains in the winter or spring, leaving moist soil free from weeds and ready to promote rapid growth of crops. The Mediterranean part of Europe was doubtless the seat of widespread agriculture long before this art became feasible in the cooler forested lands farther north or in the moister type of grasslands like the prairies of Ukraine. The reasons for this can readily be seen. In the first place, primitive people with implements of stone, bone, and wood cannot easily clear forests, nor can they dig up large tracts of sod, especially if they have not yet learned to use draft animals for plowing. In the second place, crops like wheat, barley, rye, and oats, which are especially easy to raise and to preserve, are all found wild in the eastern Mediterranean region. Thirdly, cultivation is easy there because in large areas the dry summers prevent the growth of heavy sod and of forests, so that even with very crude tools the ground can be prepared for seed. Then, too, the dry summer greatly facilitates the storage of the grain when once it is harvested. And finally, natural irrigation is easily available in many areas where the Mediterranean climate prevails, and this is especially helpful in the more primitive stages of agriculture.

Many considerations led the early European farmers to live in villages rather than separately, and this has continued until now. The love of sociability, the desire to obtain protection from enemies, the necessity of being near a supply of water that does not dry up in summer are among the powerful factors that have led agricultural people to live in villages. To an American or Scandinavian, who is accustomed to seeing the farmers living in isolated farmhouses on their farms, it is a surprise to see how few of the agricultural people of Europe live in this way. In the Mediterranean countries the peasants practically all live in villages, and walk to their work, just as they have done for thousands of years. The same is true of the rest

of Europe except in Scandinavia and among a relatively small number of people in countries like England, northern France, and northern Germany. Isolated farmhouses are also seen in various rugged regions like Switzerland where it is hard to find arable land for a whole village within easy walking distance of any one spot.

Such a development of scattered homes is greatly favored if there is security for both man and beast. In Europe nature has provided such security from the earliest times in regions like the Alps and the Frisian marshes of Holland. Ahlmann tells how in Sicily the Arab civilization at one time reached so high a level, both in security and otherwise, that the farmers began to live in scattered dwellings among the fields. Then the introduction of Norman feudalism destroyed security and ruined this system. So the population again became concentrated in villages where the people were protected by feudal lords to whom in return they rendered service. A more recent example is found in Sweden where the rigid village communities were more or less purposely broken up near the beginning of the nineteenth century. This caused the peasants to move out to their land, leaving the villages merely as the centers of religious, commercial, and social contacts. Today the breaking up of great estates in Hungary and other independent parts of the old Austro-Hungarian and Russian Empires is causing a similar development of farm homes outside the villages. Nevertheless, in most parts of Europe the peasants still live in villages which are set in the midst of fields where one sees no houses and not even any fences. Fences around fields and pastures, be it noted, are mainly a phenomenon of the New World, and are practically unknown in Europe. They are expensive to build; they occupy valuable land; and labor is so abundant and cheap that at least a child or an old person can always be found to keep the animals from straying when at pasture.

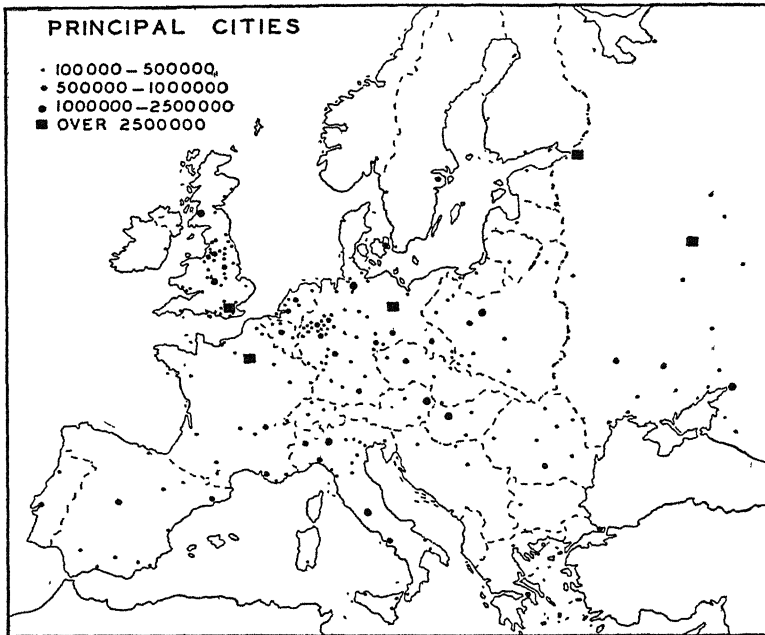
Appearance of European Villages.—So far as outward form is concerned, the present European villages show a great variety of types. Even in a small country like England there are many different styles of architecture. The ugly, square, two-story, stone houses of Cornwall are utterly different from the pretty, one-story, whitewashed, thatched cottages which still persist nearby in Devon. Both are quite different from the more varied villages of Kent where relatively modern houses surround an old stone church and stand half hidden among fruit trees and gardens. Across the North Sea the villages of northern France likewise have houses of stone or brick standing among orchards and gardens and surrounded by hedges. In the peat regions of Holland some villages stretch for miles along the roads

at the foot of the embankments on which are the canals. In central France many villages show little except forbidding stone houses rising from narrow streets paved with cobblestones and without sidewalks. In Baden a similar condition is made still less attractive because small paved courtyards wide open to the street are used as manure heaps for the stables that stand behind them. Not far away in Bavaria a lovely type of village is found where the houses stand separately in little gardens, fruit trees are trained on their walls, boxes of flowers hang below each window, and the cattle are kept well back from the street. In the southern Alps of France some villages consist of stone houses four or five stories high. Belgian and Italian villages suggest small cities. In Belgium a village often comprises a row of closely spaced houses on each side of a paved road so that one seems to be driving through a city although all the land behind the houses is cultivated as far as the eye can penetrate. Many Italian villages are perched on hilltops and consist of stone houses three or four stories high built in regular blocks like those of cities.

Space forbids us to do more than mention the tree-shadowed villages of Holland built around the church and with well-washed brick houses and brick streets, or the long villages of eastern Prussia which stretch along the street for miles, thus showing Germanic colonization in a Slavic environment. No less interesting are the huge agricultural villages of Hungary as large as cities, but full of little gardens and orchards surrounding small one-story houses. Equally large villages are found in Spain, but there each street is bordered by a solid wall of whitewashed adobe with doors here and there through which one looks into a paved courtyard where mules, goats, and pigs are standing, or perchance into a richer house with a "patio" surrounded by flowering shrubs and fruit trees. Far away in the northern parts of Poland and Russia the village houses take the form of whitewashed log cabins. In Turkey and southeastern Russia whitewash largely disappears and the villages become clusters of gray adobe walls and flat roofs of dried mud. Whatever the type of village, it is as much a part of the landscape and as dependent on the geographic environment as are the cultivated crops, the meadows, and the forests. It is one of the main factors in the *man-made* landscape which replaces the natural landscape in so much of Europe. Greater security and freedom may cause the farmers in many regions to live in more scattered settlements, but the village remains overwhelmingly the most frequent type of settlement among Europe's rural population.

Cities. Their Location.—The present European cities had their dawn in the early Middle Ages after migrations and wars had led to a

total breakdown of a great urban period under the Roman Empire. Very often the old sites of the Roman cities were used, but the cities developed in new ways. This was natural, for the same conditions which had been favorable for cities in Roman times were favorable in the Middle Ages. Harbors and river ports where good land routes meet navigable waterways were highly desirable. A third of the large cities shown in A197 are seaports, and about as many more are located on navigable rivers. Another highly desirable location for a city was close to fertile plains or lowlands forming a hinterland whence food could be easily brought and where a prosperous agricultural popula-



A—Cities in Europe.

tion needed a center not only for trade and government but also for the concentration of the simple industries of that day. The need of good routes of transportation as well as of a prosperous hinterland meant that cities had to be located at a low altitude. The highest of the large modern cities shown in A197 is Madrid, 2,300 feet above the sea; but such altitudes are rare, and even Madrid is on a comparatively level plateau. Another factor, namely a location that could easily be defended, was much more important for cities in medieval days than now. Thus it happened that many cities grew up in defensible sites under the protection of a church, monastery, or castle.

Outgrowing in many cases their need of protection by church or castle, the medieval city at length presented a marked contrast to the villages. Its citizens were free. Its public buildings, such as town halls, churches, and guild houses, and even some of its houses, were beautiful; it had schools, and in many cases universities; and it became the center of cultural development. This fostering of intellectual life is perhaps one of the most important contributions that the growth of cities has made to European civilization. Political life also made progress in the cities, for the free burghers had no such respect for the feudal lords as had the peasants.

Former Size of Cities.—In spite of their cultural and political importance, the cities, before the age of manufacturing, comprised only a small part of Europe's population. According to Knight's *Economic History of Europe* a study of tax rolls, guild lists, and the like indicates that in the fifteenth century Paris, with some 300,000 souls, was the largest city of northern Europe. Flanders, however, was by far the most highly urbanized region. It is actually described as a continuous city. Bruges, Ghent, and Ypres have been estimated at 100,000 or even twice that figure, but it is doubtful whether any of them had over 50,000. Even in Flanders 25 per cent would probably be a generous estimate of the proportion of town dwellers. London, which in the fifteenth century followed Paris and the towns of Flanders in size, had only about 40,000 inhabitants. No other English town appears to have had as many as 15,000, although perhaps a dozen had over 5,000. Aside from Paris the population of the larger French towns ranged from 5,000 to perhaps 25,000. In Germany, according to Knight's figures, Nürnberg and Cologne had about 20,000, but cities as famous as Frankfurt and Basel had well under 10,000. The bulk of the population of northern Europe lived in villages of 300 or less. In whole English counties, two thirds of the people were found in villages of less than 120 inhabitants. City life was important chiefly because of the changes it was destined to produce rather than the numerical size of the population.

Up to the industrial revolution in the eighteenth century this picture of a rural population dwelling in little villages, and with only the beginnings of urban life, did not change very much. At that time Paris and London, being the capitals of Europe's most progressive large nations, had each attained a population of about three fourths of a million, but they stood head and shoulders above the other cities. Others like Amsterdam, Vienna, and the three Italian cities of Naples, Palermo, and Rome had between 100,000 and 200,000 inhabitants. All the other cities that now boast large populations were small, and many

were still in the village stage. It is obvious that, in order to have attained their present size, European cities must have grown almost as fast as those of America.

Modern European Cities.—The combined influence of manufacturing and commerce caused the growth of the modern European city and changed rural western Europe into its present urbanized form. A197 shows how closely the distribution of great cities is correlated with that of the manufacturing regions and how outside those regions urban centers are greatly scattered. The percentage of the population living in great cities varies from 44 in Great Britain to 4 in eastern countries such as Yugoslavia and Bulgaria. Even the Mediterranean countries, in spite of their urban traditions, have only 12 to 15 per cent of their population in great cities, which is far below Germany's 27 per cent. Among Europe's 215 cities with approximately 100,000 people or more, no less than 100 are included within a line drawn through the following cities: Glasgow, Plymouth, Paris, Munich, Budapest, Warsaw, Berlin, Hamburg, and Edinburgh. Trace this line on a map and see how small a part of Europe it includes and how closely this part agrees with the great manufacturing zone. Nine cities of over a million inhabitants are here, a quarter of all those in the entire world. All the rest of Europe has only three—Rome, Moscow, and Leningrad.

The modern city has lost a great deal of its former aspect. The old walls and moats are gone, or have been used for parks and boulevards as the population increased beyond the old limits. The center, used for shopping and commerce, still shows the ancient condensed character with solid blocks of houses where dwellings, shops, and stores are intimately mingled. The population, however, has spread out over what were once rural districts. These, although urbanized, do not show the compact character of the center. Nevertheless, the city people mostly occupy small apartments or tenements in big blocks of buildings four to six stories high. Such buildings often rise directly from the fields where the peasants are still cultivating the land, as at Vienna and Madrid. Suburbs in the American sense, where great numbers of people live in separate houses with lawns around them, are rare in Europe. Only in Scandinavia are they as highly developed as in the United States. In England, to be sure, a great many people live in two-story individual houses on the outskirts of the cities, but the houses usually touch one another or are separated merely by alleys and have only the tiniest lawns or gardens in front of them. In some places, not only in England but also in other parts of progressive western Europe, attractive "garden suburbs," as they are called, have grown up in the American style

with plenty of trees, lawns, and shrubs. These, however, are common only in the North Sea countries. Elsewhere they are the homes of only a few relatively prosperous people, as in cities like Vienna or Riga. In central Europe, especially Germany, this scarcity of real suburbs has led to the growth of a system whereby people acquire little garden plots outside the cities, build tiny shacks there, and come out for weekends in summer. In Germany they are marvelously well kept, each with its flowers and vegetables.

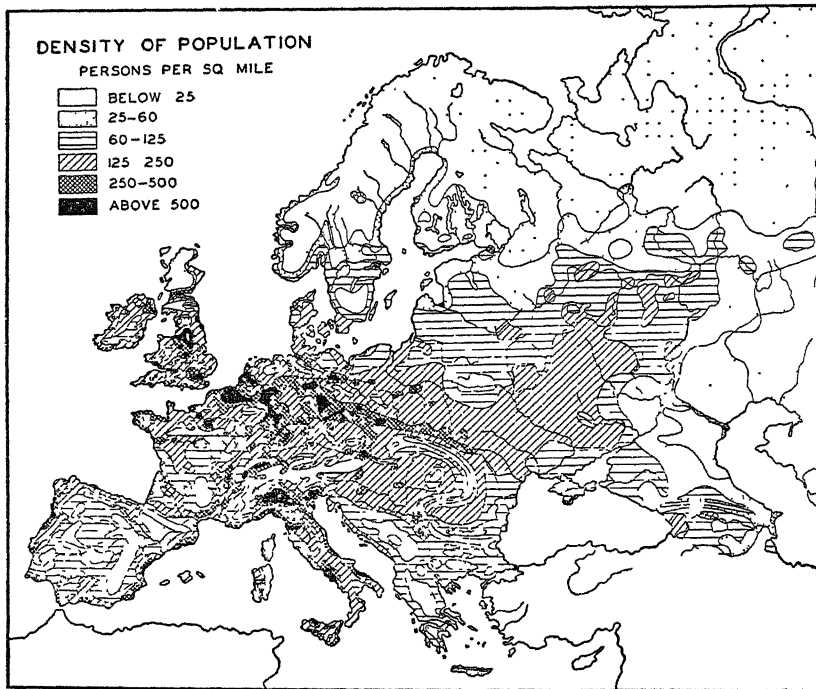
One reason for the lack of suburbs is that the means of transit are by no means so good as in the United States. Although trolley lines are now common, they did not develop so rapidly as in the United States. The automobile, which now carries millions of Americans from the suburbs into the cities to their work, is too expensive to be used thus on any large scale in Europe. Around the North Sea its place is taken by the bicycle, especially in Denmark and Holland, and even by the motorcycle, especially in Germany. A similar but less extensive use of the bicycle is found in many parts of France, Italy, and other countries. Elsewhere, even in such countries as France or Czechoslovakia, vast numbers of people walk to their work.

The tendency to walk to their work, or at least to use only a bicycle, is increased by the fact that in many European cities the center is commercial but not industrial. The modern factory has no place in the city nucleus, because that section was fully built up long before large factories came into existence. Except where concentrated around harbors, the factories have usually been located in the urban outskirts where land is cheap and people can live nearby. Thus in a city like Düsseldorf one sees big factories and big tenement houses for factory workers rising out of the fenceless fields not far from villages which are still of the agricultural type.

All this has made city planning a necessity. The conditions of health which once made the cities the death traps for the people who migrated thither from the surrounding agricultural villages have improved steadily. Slums have been replaced by workmen's homes of modern hygienic architecture, while large parks break the monotony of the sea of houses. Nevertheless, it is still true that when people come from the rural districts to work in the cities their deathrate greatly increases. In most European cities, if allowance is made for the large proportion of young people, the deathrate is still so high and the birthrate so low that the city population would dwindle if not replenished from the country. Some of the worst conditions are represented by Lodz, in Poland, which is still a dirty, ugly manufacturing city, a compact mass of smoke-colored houses, with scarcely a

redeeming feature. In Bucharest, an attractive modern center contrasts strongly with the still medieval conditions in most of the surrounding parts of the city. Copenhagen, on the contrary, with its beautiful central portions, its thousands of little suburban houses set in gardens, and its throngs of bicycle riders, represents the opposite extreme.

Distribution of Population.—A201, in a very generalized way, shows the density of population when rural and urban people are both



A—Density of Population in Europe.

taken into account. Except in the south and in Holland the areas of very high density coincide with the urbanized major industrial regions. This is one of the most notable and also most recent features of the distribution of population. It means that the favorable conditions of climate, location, and mineral wealth which have fostered manufacturing have caused these industrial sections to depend on food and raw materials from remote regions as well as from near home. Some of the other factors which influence the distribution of population are as follows:

1. The soil has considerable influence. In A201 the fertile dark-

colored soils of Bohemia, the northern Carpathian Forelands, and the Russian Black Soil Belt, as well as of smaller areas in the Danube Basin, stand out as areas of rather high density. The best black soil in the Ukrainian portion of Russia gives twice as great a yield per acre as the poor swampy soils a few hundred miles to the north. Unfortunately, however, even in places like Ukraine, as has been shown in the chapter on land utilization, the yield per acre is rather low, and there is a corresponding degree of agrarian overpopulation. Since similar conditions prevail in most of the agrarian regions of eastern Europe, we conclude that although good soil raises the density of population, it does not help the peasants very much even though it may enrich the large landowners. The gardens of Italy, which obtain their fullest development on the fertile volcanic soils of the Campania around Naples, show agrarian densities comparable to those of India, China, and Japan.

2. A combination of good soil, favorable relief, and advantageous location also permits a very dense population on the coastal plains of Spain and Portugal, and in most of Italy. In Italy, however, the map gives little indication of the detailed contrasts between the high density where the garden type of agriculture prevails in the plains and valleys and the emptiness of some of the uplands and unhealthy coastal regions. An example of the last is the coast of Tuscany, northwest of Rome, although now malaria has there ceased to be a danger through the sanitary efforts of the government. The irrigated coastal plains of Valencia, Murcia, and northern Portugal with its corn-wheat climate, also show a very high density of population.

3. Holland and Flanders likewise show a similar condition, a result of intensive fruit and truck farming together with well-developed activity in manufacturing and commerce.

4. Mountains, marshes, and arid regions, on the other hand, stand out because of their sparse population. Examples of this are seen in the Alps, the Pripet marsh on the border between Russia and Poland, and the dry Spanish Meseta and Caspian Plains. The general density of population also decreases rapidly towards the north because of the short growing season even where there are no mountains.

5. In its Balkan portion A201 is very unsatisfactory because it does not show the great complexity of the contrasts between the dense population of the narrow coastal plains, the river valleys, and the mountain basins on the one hand, and the sparse population of the rugged and hence deserted mountain blocks on the other hand.

CHAPTER XVI

PROBLEMS OF POPULATION *

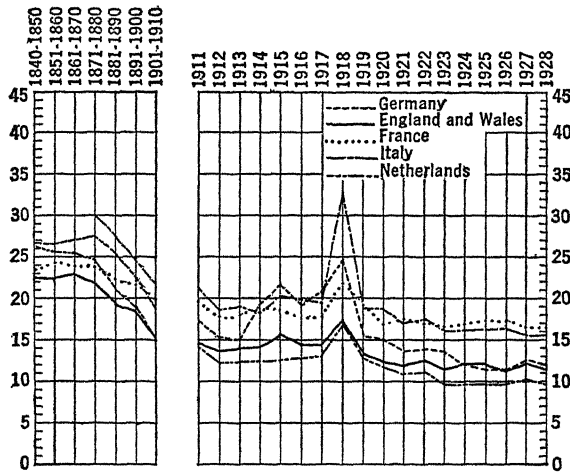
Rate of Increase.—The rate of increase in the population of Europe has changed greatly in recent centuries. So far as can be judged from fragmentary records, the population had remained almost static for a long time before 1700. This was due in part to people's inability to exploit new resources, and in part to the extremely high deathrate. Not only was medical science of the sketchiest sort, but what little knowledge existed was concentrated in a few intellectual centers.

Epidemics were especially effective in retarding the growth of population. Cholera, smallpox, bubonic plague, tuberculosis, and typhus caused the death of millions of people. In spite of the best efforts of modern medicine, the influenza epidemic of 1918 and 1919 took a terrible toll of lives as appears clearly in the sharp rise of the lines in A204 at that date. It is easy to understand how, in earlier days when doctors relied on "dragon's blood" and the burning of aromatic herbs, and knew nothing of the laws of sanitation, epidemics swept from country to country, decimating the population. The most famous of these epidemics was the Black Death, or bubonic plague, which came from Asia. From 1348 to 1350 it ravaged all the countries of Europe in turn. It carried off two thirds of the population of central Italy; a third, a half, and in some places two thirds of the inhabitants of Lombardy, northern Spain, France, England, the Low Countries, and Germany; a half or two thirds in the Scandinavian and east European countries. The towns were attacked with special severity. Venice lost two thirds of its population; Bologna, four fifths; Florence, 80,000 to 100,000 souls; Majorca, 30,000; Paris, 40,000 at one time. There were 800 deaths a day in Paris. The disease reappeared nine times in Italy, four times in Spain, five times in England. As far as can be calculated it cost from 24 to 25 million human lives.

A second factor in retarding the growth of population was the frequency of wars. These not only claimed many lives on the battlefield and through disease, but in addition involved the ruin of crops

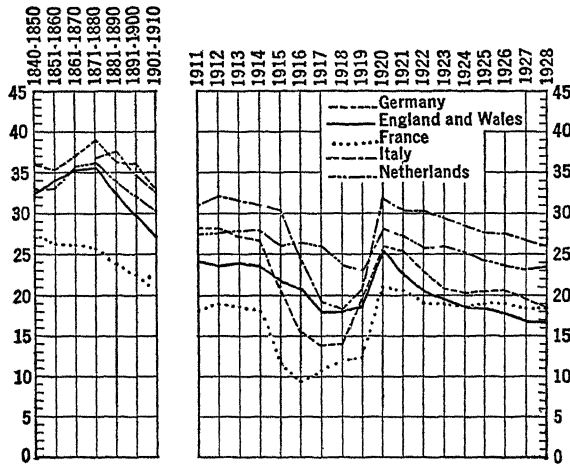
* This is one of the chapters which may be omitted in a short course, as explained in the Preface.

and so brought starvation, for pillaging and burning were always a part of war. The wars attending the great migrations that began in the third century and led to the final fall of the Roman Empire



A—Changes in European Deathrates.

may serve as an example. They left a trail of ransacked towns, burned villages, and trampled fields. It was centuries before Europe again showed signs of cultural and economic progress. Likewise dur-



B—Changes in European Birthrates.

ing the Thirty Years' War in Germany the loss of life and property was enormous. In Bohemia the population fell from 3,000,000 to 800,000.

A third factor in restricting the population was economic. Lack of adequate transportation, together with inability to preserve food, made the peasantry depend for subsistence solely upon the crops of each year. Crop failures, which were by no means uncommon, especially in eastern Europe with its relatively unreliable climate, often led to such disastrous shortage of food that starvation claimed its victims in millions.

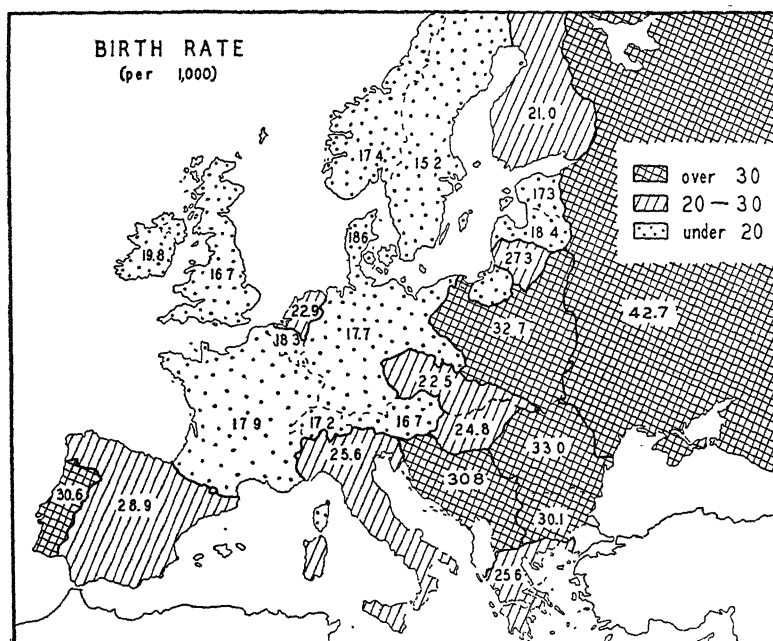
The eighteenth century saw the beginning and the nineteenth the substantial progress of changes which helped to minimize these destructive forces. The development of agriculture and manufacturing stimulated trade, which in turn furthered improvements in transportation. Scientific study and the effective application of its discoveries went far to combat disease. Mortality decreased rapidly, as appears in A204, especially in the more advanced states of western Europe where medicine was first put on a scientific basis. Wars became less frequent than formerly. They also affected the civilian population less seriously, although in the World War the mortality among German civilians was sharply increased by the Allied blockade.

Modern Tendencies in Growth of Population.—Today the economic factor that once limited population is virtually eliminated, for rapid transportation and the spirit of international co-operation usually make it possible to furnish effective relief to acute distress anywhere. Only in Russia does Europe have a region where there are still real famines in years of bad crops. These owe their fatal effects principally to the inadequacy of the transportation system, consisting mainly of rivers which are frozen during many months of the year. The Soviet economic administration is also partly responsible, for it reckons on good rather than poor crops, and has often failed in international co-operation, thus restricting foreign help. In the German Republic of the Volga, the most progressive and prosperous area in that part of the U. S. S. R., the famine of 1921 caused a decline of 17 per cent in the population between 1921 and 1926.

In spite of such minor setbacks in marginal areas the period since 1700 has seen a tremendous growth in the population of Europe. By 1800 the population had risen from 120 million to 175 million, and now it is 500 million. During the nineteenth century, to be sure, the advent of higher standards of living was accompanied by a marked drop in the birthrate, particularly in western Europe, but as this was accompanied by a corresponding decrease in the deathrate, the population continued to increase about as before. Today in much of the continent the density of population approaches that of India and

China. Nor has this increase come to an end. Each year about 6 million people are added to Europe's population.

The excess of births over deaths which gives rise to these 6 million new people each year is very unevenly distributed. This is evident from a comparison of A22 showing mortality with A206 showing births. The map of deaths shows the general European tendency towards favorable, which here means low, figures, around the North Sea and an increase towards the east and south. The map of birth-rates also shows a general increase from Great Britain to Russia, and

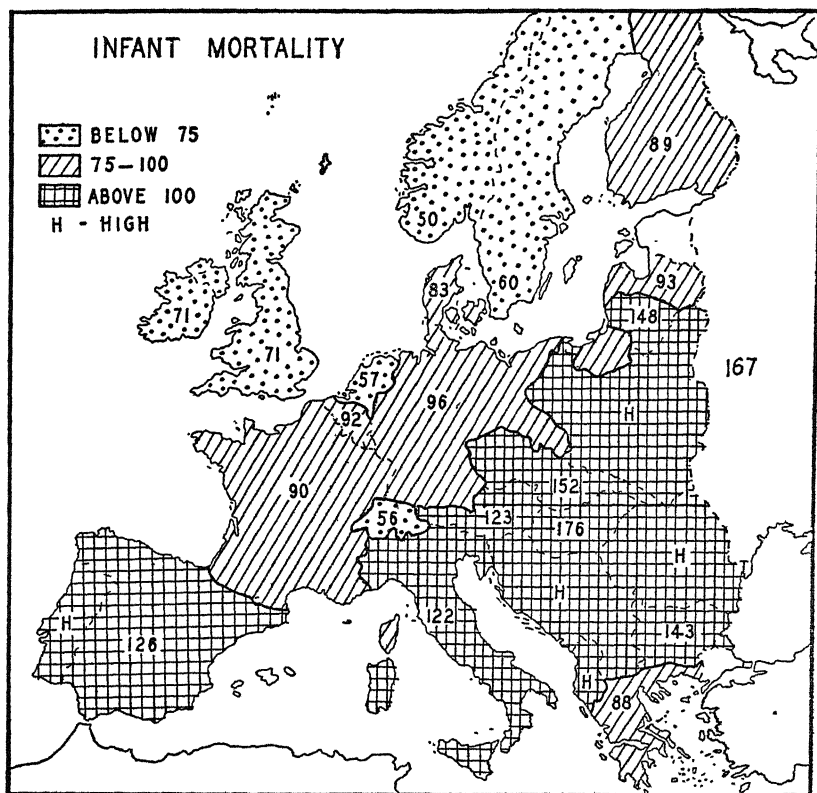


A—Birth Rates in Europe per 1000 Inhabitants. Average of 1929-30.

the increase is much more rapid than that of deaths. This means, of course, that most of the growth of population takes place in Russia and the Mediterranean lands, that is, in Europe C. This is very clear in A207 which shows the rate of natural increase when the deaths are subtracted from the births. Evidently the population of Europe is increasing most rapidly in the poorest parts just where one would say that it ought not to increase. Of interest in this connection are the figures for Holland. That country, like its neighbors, has a low deathrate, but its birthrate and hence its rate of natural increase are comparatively high. This may reflect a tendency toward a relatively

higher birthrate under very favorable economic and social conditions, a tendency which has lately manifested itself among the most successful families in Sweden, the United States, and elsewhere. At any rate the Dutch have a more steadily reliable basis of prosperity than that of any other people in Europe.

The Pressure of Overpopulation.—The rapid growth of population has put a severe strain upon Europe. For a while the still more rapid

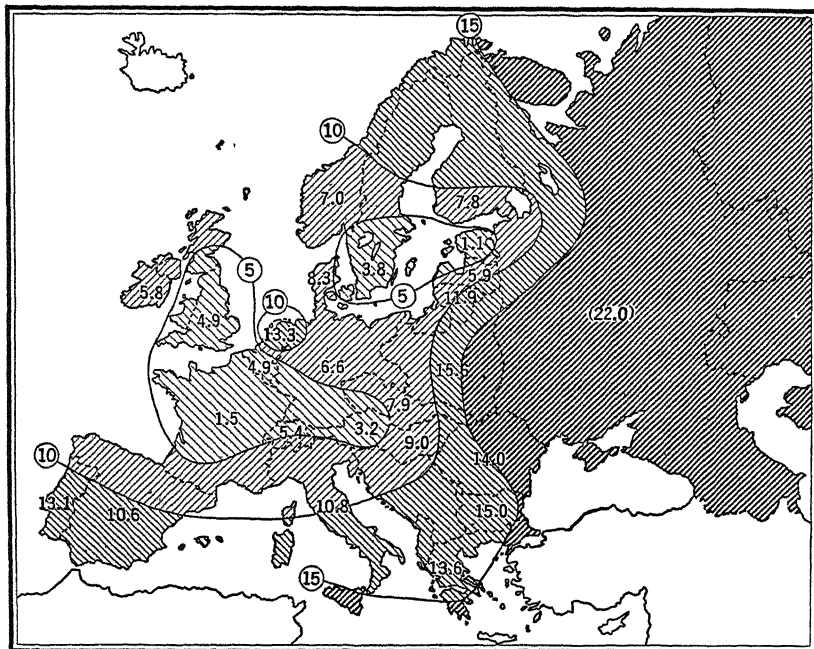


A—Infant Mortality in Europe per 1000 Births. Average of 1929-30.

growth of manufacturing and the improvement of transportation allowed the North Sea region to import food in exchange for manufactured products. This has become increasingly difficult, however, because the United States, Japan, and other countries tend more and more to supply not only themselves but other people with manufactured goods. So Europe is at last forced to face the stark problem of overpopulation.

During the nineteenth century it was supposed that emigration

in conjunction with manufacturing would solve Europe's problem of overpopulation. This hope has proved illusory in spite of the fact that tens of millions of people have left the continent. During the first half of the nineteenth century about 5 million went overseas, of whom nearly half came from Great Britain and Ireland, and a fifth from Germany. More than half of all these went to the United States. During the second half of the century, and in the years before the World War, this emigration reached a tremendous figure. At the



A—Annual Rates of Natural Increase in Europe, per 1000 Persons.

beginning of this period most of the emigration was from Great Britain and Germany (some 700,000 yearly); later there was a gradual but definite shift toward eastern Europe, producing a new flood that just before the War amounted to about 2 millions a year. Yet even this left a surplus of about 7 million new inhabitants of Europe each year.

The World War interrupted this emigration, and thus caused the population of Europe to increase about as much during the war as it had during the years of peace immediately preceding. Of course the war occasioned great loss of life through hardships imposed upon

civilians as well as directly, but this scarcely balanced the checked tide of emigration.

Although emigration played a part again after the war, it was on a considerably smaller scale, being only about 500,000 a year until the depression that began in 1929 put an end to it. Chief among the reasons for this decrease were the policies of restriction adopted by several important foreign countries, especially the United States, in order to protect their own economic and social structures. Then, too, some European governments themselves discouraged emigration. In Italy Mussolini inaugurated a policy of intensive domestic development which would engage all of the nation's young manpower. Russia prevents any of her people from emigrating. In addition to this the practice of paying dole to the unemployed of countries like England and Germany has doubtless served to keep at home numerous individuals who would otherwise have been disposed to emigrate. Thus since the war the overpopulation of Europe has increased more than ever. Inasmuch as this has been accompanied by a sharp decrease in industrial activity and trade, many people think that, if Europe could get rid of a quarter of her people, the continent would be greatly benefited.

Overpopulation is undoubtedly one of the principal causes of Europe's economic difficulties and of the political agitation which they engender. For the European family it necessitates a lowering of the standard of living because the individual buying power is reduced. This entails psychological as well as economic consequences.

How tremendous the pressure of population may be was illustrated in Russia when the collective system of agriculture was introduced. The peasants gave up their land and each village worked collectively, all supposedly sharing the work according to their capacity and the products according to their needs. At first, however, the more competent peasants resisted this innovation, and the less efficient ones thought that they would be supported even if they worked very poorly. Other circumstances, both physical and social, aggravated the difficulty, and the crops in 1932 were very small. The government took a large share to feed the city people. As a result starvation and death faced the peasants. William H. Chamberlin, who lived in Russia at the time and is one of the best authorities, thinks that 4 or 5 million people died as a result of these conditions, although most of the deaths were never recorded. Such a thing could happen only in a much-overpopulated country where there is practically no margin beyond the mere needs of subsistence.

England and Russia occupy two strongly contrasting positions in

respect to unemployment, as in many other ways. Ever since the World War England has acknowledged that it has a great army of unemployed. Many young men who became of age during the years succeeding the war have never had a steady job. But the number of people who have suffered from hunger or even from cold is almost negligible. The employed have supported the unemployed by means of the dole. Russia, on the other hand, denies that it has any unemployment. This, however, is more apparent than real; the 80 per cent of the population who are peasants are all counted as employed. The long winters, however, and the introduction of tractors, together with the decline in farm animals, mean that the men on the farms have nothing to do about half the time. Moreover, no account is taken of a great number of declassed persons—the old bourgeoisie or middle class, who are debarred from finding work. The net result is that, in spite of the ostensible absence of unemployed persons, the average Russian probably lives less comfortably than does the family that is on the dole in England.

The problem of overpopulation in the rest of Europe shows the same general phases as in England and Russia. In the manufacturing regions of Europe A there has been chronic unemployment but much help from governmental agencies. In the agricultural regions of Europe C there has been great agrarian distress because the prices of farm products have been so low compared with those of manufactured products. The most comfortable parts of Europe have been those like Denmark, Sweden, and Holland, where there is a fairly good balance among different types of occupations and where agriculture is based on highly developed specialties such as the dairying of Denmark and the fruit and truck farms of Holland.

In both fields and factories, so long as our present faulty system of getting goods from producer to consumer continues, the introduction of new machinery is temporarily an additional handicap. In the long run new machines undoubtedly create new jobs and ultimately raise the standard of living. The trouble is that our system of distribution—of buying, selling, paying wages, and making profits—has by no means kept pace with our mechanical inventions. Thus until the old system is greatly improved, or a better one takes its place, new machines temporarily exaggerate the present difficulties.

Facing the Future.—For Europe as a whole, the present condition of overpopulation carries the gravest threats. It not only entails serious economic difficulties, but even may easily lead to international disputes, political disagreements, and war. Countries in distress, like individuals in ill health, are inclined to be quarrelsome. The ethno-

graphical complexity of Europe also tends to promote discord under such circumstances, for differences in national character often result in ill feeling. Another serious aspect of the problem is that people tend to migrate from the most densely overpopulated countries to those where the pressure of population is less severe. We have already seen that this means from the more backward to the more advanced countries. If the Russians, Italians, and other people of Europe C were free to migrate wherever they chose, there is little doubt that during times of prosperity elsewhere a flood of migrants would pour outward. The suppression of this desire for migration, both by the home countries like Russia and Italy where it starts and by the countries like the United States and Canada to which the emigrants would naturally go, creates very grave complications both at home and abroad. Finally, overpopulated countries are tempted to seek some outlet for their surplus by annexing or otherwise obtaining power over other sections of the earth which are still capable of sustaining large numbers of people, or of providing markets and raw materials. Such activities are very likely to end in war. France and Italy have more than once been almost on the brink of war over Tunis. Indeed, governments in political difficulties of this character sometimes welcome war as a convenient means of distracting attention from internal troubles.

Seeking a Remedy.—The possible remedies for the serious overpopulation of Europe fall into three classes involving either an increase in production, a new system of distributing the products of labor, or a decrease in population. The first has been in operation for nearly two centuries—ever since the beginnings of scientific agriculture and the use of power for machinery. Even if there had been no colonization of new lands the increased productivity per acre and per man which arose in this way would have permitted a considerable share of the fourfold increase of population which actually occurred during the past two centuries. Doubtless there are still considerable possibilities of improvement along this line. The land can be made to yield more per acre, and with modern machinery some new land is worth cultivating even in Europe. The continent could more than feed itself if it had to. Moreover, there are plenty of places outside Europe where food and also raw materials like rubber, cotton, and oil can still be obtained in exchange for manufactured goods. The productivity per man in manufacturing can also be increased enormously. The overpopulation of Europe, then, is not due to any lack of productive ability.

Such being the case, it seems clear that the trouble must lie in the

way in which products are distributed from producer to consumer. One trouble, peculiar to Europe, is the small size of the countries and the consequent innumerable tariff walls. This, however, is a small matter compared with the worldwide difficulty arising from the fact that our methods of buying, selling, paying wages, and dividing profits are full of cumbersome features inherited from a wholly different age before there were any such things as modern industry and transportation. Russia thinks that she has found a remedy for this by eliminating middlemen and private profit, but western Europe seems disposed to accept this system only with great modifications. It remains to be seen whether some other and better way of accomplishing the desired result can be devised.

The third way of meeting the evils of overpopulation—by reducing the number of people or at least diminishing their rate of increase—has also been in operation for a long time. In former days it took the form of haphazard, cruel deaths due to disease, war, pestilence, and famine. In recent years it has taken the form of a rapid reduction of the birthrate. This appears in B204, which illustrates the changes in the birthrate in the countries whose deathrates are shown in A204. On the whole there has been a decline in all countries since about 1880. The great drop during the World War was partly balanced by a sudden rise in 1920, but then there began a steady drop which was not interrupted until 1934. The case of France is especially interesting. The decline in the birthrate began there much earlier than in other countries and fell so low that the deaths much exceeded the births during the World War. Then the French birthrate showed a greater proportional rise than the others and is now at about the same level as that of Germany, England and other countries. It is higher than in some countries, such as Sweden and Ireland. The rate of increase in population (A208) is measured by the difference between the curves of A212 and B212.

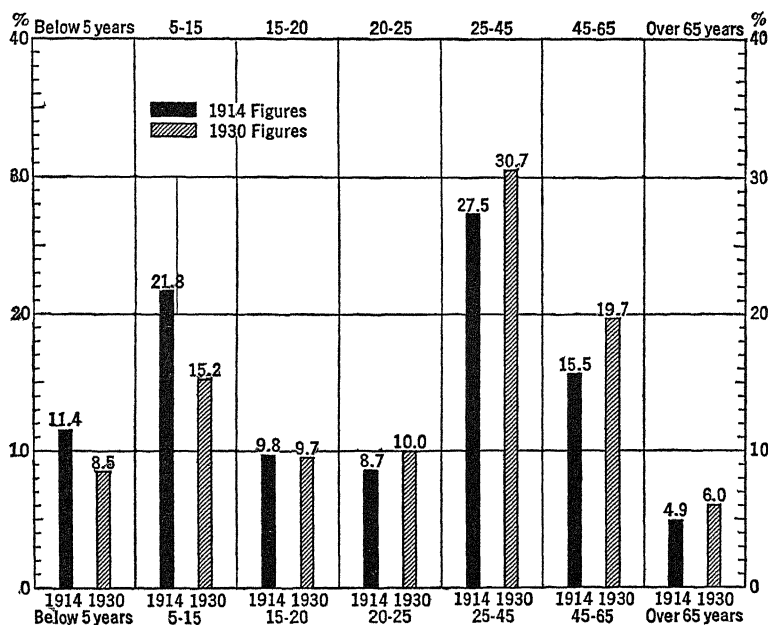
✓ In eastern and southern Europe—Europe C—a different situation prevails. The rates of both birth and death have in most countries declined somewhat, but the interval between them still remains large. In many cases it has actually increased because the deathrate has fallen faster than the birthrate. Exact data are scarce in these countries not only because statistics have not been well kept, but also because the national boundaries in the east were so radically changed after the World War. Nevertheless, in Spain, Greece, and Russia the excess of births over deaths actually increased between 1921-5 and 1926-30; in Ireland, Lithuania, and Portugal there was no appreciable change, while everywhere else there was a decline. The actual situa-

tion, as seen in A208, is that large parts of Europe A now show an annual increase of less than 5 for every thousand of the population, and no parts except Holland show over 10. On the other hand all of Europe C shows a rapid increase which amounts to more than 10 per annum everywhere and to over 20 in Russia.

From all this it is clear that in the more advanced parts of Europe the pressure of overpopulation tends to be relieved by a decline in the rate of natural increase. Part of this decline is doubtless due to deliberate birth control, and part to other causes such as the work of women in factories, the decline in the percentage of the population engaged in agriculture, the prolongation of education, and the tendency toward a rising standard of living. The process of reducing the birthrate has now gone so far in most parts of Europe A that any further reduction would soon lead to an actual decline in population. It cannot be balanced by any further reduction in the deathrate, for already the limit has been practically reached. Only where the population is growing is it possible to have deathrates as low as 10 or 11, such as prevail in Holland, Norway, and Denmark.

This last point needs explanation. Suppose that we have a so-called stationary population, that is, one in which the births exactly equal the deaths. If each year sees 20 deaths per thousand of such a population, there must also be 20 births, and each person must live an average of 50 years. If the health of the population is extremely good, however, so that the average age at death is 65 years, the deathrate and birthrate will have to be 15.4. France with 16.7 deaths and 18.2 births per thousand persons each year from 1926 to 1930 approximates this condition. A deathrate of 10, on the other hand, would mean an average life of 100 years in a stationary population. In actual practice, however, it means that the average life is perhaps 60 or 65 years, but that the birthrate has been so high that there is a very large proportion of young people, among whom the deathrate is of course very low. This is illustrated in A214 which shows the percentage of the German population at various ages in 1930 in comparison with the corresponding percentage of 1914. The low level of the 1930 bars for persons under 5 years of age and especially from 5 to 15 years of age, means that the birthrate has been low since the war and the percentage of children in the population as a whole is becoming smaller. Young people 15 to 20 years old were equally numerous in both years. The percentage of older people, however, is rising. Thus for those 25 to 45 years of age it was considerably higher in 1930 than in 1914, while among those 45 to 65 years of age the relative difference between the two years is still greater. The small number of children at the ages

below 15 reflects in the main the reluctance of potential parents to face the economic hardship of trying to raise a family in the difficult post-war years. After 1950, when the numerous people who were 25 to 45 years of age in 1930 begin to die in large numbers, Germany is almost sure to have a high deathrate, for there will be relatively few people of the younger ages, where the deathrate is low. Unless there is a continuance of the rise in the birthrate which began in 1934 after a drop to 16, the future may see a reduction in the German population. Since this is also true of most parts of Europe A, it appears that this por-



A—Percentage of Germans at Various Ages.

tion of the world is automatically, although slowly and painfully, solving its problem of overpopulation.

If this western European tendency were to prevail in eastern Europe, it would offer hope for the future. It would limit the total population of the continent in some degree, and the constantly recurring problem of overpopulation would be largely met. But so long as the growth of population is limited only in Europe A, the limitation involves grave consequences. It serves to diminish the proportion of the European population which is culturally high, while the relatively backward eastern and southern portions suffer an increase. Such an increase is certain to give rise to many new and serious problems in

the near future. So far as is now evident, it seems scarcely probable that even in the present era of progress, eastern and southern Europe will in any brief time either raise their cultural level to approximately the present general average of the continent, or reduce their birthrate and prevent further overpopulation. Thus Europe A will tend to hold Europe C at bay in order not to be flooded by the latter's excess of population. So the two parts of the continent are likely to differ even more than now not only in the cultural character of their people, but likewise in political and economic interests.

CHAPTER XVII

THE MARCH OF CIVILIZATION *

The Migration of Centers of Culture.—The center of civilization in Europe and neighboring regions has moved from southeast to northwest. We have seen this in agriculture, transportation, and industry. It is equally true of art, science, government, education, and other phases of human progress. Five or six thousand years ago the earliest great civilizations flourished in Egypt and Babylonia. At a later date great centers arose in Crete, Syria, and Assyria, four or five degrees north of the earliest centers. Then Greece took the lead, another two or three degrees to the north and farther to the west. Rome, still farther north and west, comes next. During the Dark Ages and the great recession in human progress the lead passed to Constantinople in the east, but this was soon overshadowed by Venice, Florence, and Genoa, even farther northwest than Rome. These in turn gave place to Vienna, Paris, and other minor cities, still another five degrees to the north. Even here the northwestward march of progress did not stop, for London, Amsterdam, and Berlin represent regions which came to the forefront still later. Last of all, in our own day, Stockholm, Copenhagen, and the Scotch cities represent extremely northerly or northwesterly regions whose extraordinarily high standards are universally recognized. Thus in four thousand years the center of human progress—that is, the greatest center—has migrated more or less steadily for 2,500 miles from Egypt and Babylonia to the region around the North Sea—from latitude 30° to 50° or more, and through 40° of longitude.

At each stage in this migration there have been zones of culture. In the center new inventions, institutions, and ideas have arisen; political and military power has reached the highest levels; industry has been most active; and art and science have flourished most steadily. Farther out in each case there has been an irregular zone of moderate progress, and outside that a relatively backward zone. The size and form of the zones have varied according to the shape and location of seas, rivers, mountains, plains, and deserts, according to the character

*This is another of the chapters which may be omitted in a brief course, as explained in the Preface.

and migrations of races, and according to the nature of new inventions, habits, and institutions. The point to be stressed, however, is the persistent way in which cultural centers and zones have existed throughout historic times, and the systematic way in which the centers have migrated northwestward.

Causes of Cultural Migration.—The causes of this migration of culture present one of the most fundamental problems in both geography and history. The migration has emphatically not been a movement of peoples, for the torch of leadership has passed through the hands of Egyptians, Sumerians, Akkadians, Phoenicians, Aramaeans, Cretans, Jews, Persians, Medes, Greeks, Macedonians, Romans, Italians, Franks, Goths, Anglo-Saxons, Vikings, Teutons, and others. Nor has the migration been merely the moving outward of ideas, although this has occurred on an enormous scale. The dominant fact seems to be that the people at the center of culture have invariably possessed unusual energy, initiative, and power of leadership compared with the people around them. This has shown itself in their inventiveness, their ability to utilize the work of their predecessors, their power of controlling other people, and their ability to elaborate and maintain new methods in ethics, religion, art, science, industry, commerce, politics, war, and other activities. This active quality seems to be the keynote of the whole problem.

The activity and progress of the great centers of civilization seem to be due to the combined effect of three great factors. One is the innate ability of the people, arising often from a rigorous selection due to migrations in which the physical and mental weaklings have been exterminated. This involves so many disputed points that it will not be discussed any further. We shall simply assume that people like the Greeks actually did possess an unusually high type of biological inheritance. The second factor is a favorable geographical environment; and the third is the inventions, discoveries, and new ideas which follow as the result of the contact between the people and their environment.

The Birth of Civilization.—At the dawn of civilization, perhaps ten thousand years ago, Egypt and Babylonia appear to have been inhabited by people of more than average ability. This may have been because the climatic fluctuations of glacial and post-glacial times had here subjected mankind to a peculiarly strenuous process of migration, selection, and possibly mutation. In the course of their wanderings these people had doubtless picked up most of the good ideas of their neighbors, although at that time the world's cultural inheritance was still woefully small. The floodplains of the Nile and Eu-

phrates furnished an almost ideal environment for the new art of agriculture which they or their neighbors invented. In the steppes around them, which appear to have been much more grassy then than now, they found the ass, horse, and camel, while presumably the sheep inhabited neighboring regions. In this same general region wild wheat, barley, oats, and rye all seem to have existed at that time. This means that the resources needed to encourage the early growth of civilization were here grouped together in remarkable fashion, just as today the resources for our modern type of civilization show a remarkable grouping around the North Sea.

The climate also was highly favorable. This statement may seem to contradict what has previously been said as to the nature of the optimum climate. There is really no contradiction, however, when two important points are considered. One is the fact that the optimum climate is not the same for all stages of civilization. The other is the fact that at the end of Neolithic times the climate of the eastern Mediterranean regions seems to have been more favorable than now. In previous discussions of climate we have described the optimum for our highly civilized, modern type of life. The optimum for people in lower stages of civilization is quite different, as S. C. Gilfillan was the first to point out. The early men who first practiced agriculture were very primitive. So far as we can tell, clothing was to them little more than the adornment of the rich; their shelters were apparently mere wattled huts of sticks; fires were made only in open hearths, usually outside the huts; windows were unknown; and there were doorways rather than doors. At the dawn of the historic era in Egypt and Babylonia conditions like this prevailed among all except an insignificant fraction of the population. Even the rich had no adequate protection against cold or wet weather.

Under such conditions the optimum temperature was obviously higher than among people who enjoy our modern methods of protection against cold. Among people on the lower rungs of the ladder of civilization one of the things that most limits productive activity and comfort is the temperature of winter. Even today an average January temperature of 50° F. in Sicily leads to a far greater rise in the deathrate than does one of 25° in Sweden. The Swedes not only know how to protect themselves from cold and wet weather, but have to do so in order to live. The Sicilians, on the contrary, not yet having learned to protect themselves properly, shiver, suffer, and die in temperatures which seem warm to the Swede. The ability of the early Egyptians and Babylonians to protect themselves from the cold was even less than that of the modern Sicilians. Accordingly the climate

that was best for their stage of civilization was one where the winter had no really cold weather. The average temperature of the coldest month for day and night together ranges from 54° to 60° in Egypt, and from 49° to 52° in Babylonia. This is about as low as people in the old Egyptian or Babylonian stage of culture can stand without suffering seriously in health and efficiency.

Unfortunately the summers in these earliest centers of civilization are extremely hot, the warmest month averaging from 79° to 95° in Egypt and 93° to 95° in Babylonia. Nevertheless, to people in the early Egyptian stage of culture such heat apparently does less damage than does low temperature in winter. The effect of the heat is mitigated by the dryness of the summers, so that a given temperature is by no means as debilitating as in China, for example, where the summers are humid as well as hot. Moreover, there is considerable evidence that in ancient days, although the temperature was about as now, the amount of storminess and hence the variability and stimulating quality of the climate were appreciably greater than at present. This, to be sure, is disputed, and we cannot speak positively. Even if the climate has remained constant, however, the river plains which provided the physical basis for the earliest centers of civilization were located where the climate approaches fairly closely to the optimum for the low stage of culture which then existed. Thus both the people and the geographic environment of Egypt and Babylonia appear to have been unusually favorable to the evolution of civilization—more favorable probably than in any other part of the world.

Inventions That Overcome Low Temperature and Humidity.—

The greatest factor in the systematic process by which the center of civilization in the eastern Mediterranean lands and Europe has migrated to the northwest appears to have been the inventions and discoveries which have given man greater and greater ability to withstand cold and rainy winters. Such inventions are almost innumerable and of great variety. Some have to do with fire. These include the invention of the hearth and in much later times of chimneys, fireplaces, stoves, and finally furnaces for central heating. The invention of the axe and of matches, and the discovery of how to use coal, have also made it much easier to live in cool climates. Other inventions and discoveries have helped mankind to prepare warm clothing. The domestication of sheep, the invention of spinning and weaving, the art of sewing, the use of power for making cloth, and improvements in the preparation and use of leather and rubber have all helped to make it more and more easy to keep both warm and dry in cold, damp climates.

Improvements in architecture have been equally important. A hut of sticks wattled with mud was a truly great invention in its day, but man has gone on to walls of mud, brick, and stone, to the use of lumber, shingles, and stucco, and to structures where the inhabitants, in winter at least, have little inkling of what the weather may be unless they look outside. Another very important set of inventions has made it possible to have light and the right degree of warmth at the same time, even in winter, a thing impossible in early days. From a lamp consisting of a smoking wick floating in oil, man has progressed through candles, whale oil, and kerosene to gas and electricity. Window glass has perhaps been of even greater importance than these other methods of obtaining light. Watersupplies, sanitary appliances, and medical care have also played a tremendous part in making it feasible to live comfortably and healthfully in cold or wet climate. Compare the stage where women carried water on their heads from a distant spring and where toilet facilities were absolutely unknown, with the modern stage of kitchen sinks and bathrooms. The contrast represents a tremendous advance in making life comfortable in cold, wet weather.

Still another phase of man's conquest of cooler climates is found in inventions dealing with the use of the land. The cooler parts of the habitable earth are naturally covered largely with dense forests or with thick grass of the prairie type which forms a sod. This is very different from the open forests and thin bunchy grass of regions with the Mediterranean and desert types of climate where civilization first arose. Until iron tools were invented it was exceedingly difficult, and on a large scale almost impossible, to clear a forest for agriculture. Until some sort of harness for oxen or horses, and a plow that would turn the sod, had been invented, it was extremely difficult to plow tough sod and to use many kinds of grassland for farming. These things seem so simple now that it is hard for us to appreciate how slowly and with what pains they were elaborated.

Consider again how necessary it has been to have a long series of inventions in order to make transportation in cold, wet regions as easy as in those that are warm and dry. In Egypt and Mesopotamia one can travel almost anywhere at any time and with little equipment and no made roads. Rain is scarce and so is mud outside the irrigated areas. It is rarely too cold or wet for the traveler to camp in the open, as is still done very commonly. Long wet storms, snow, and ice are almost unknown. Except in the steepest places the uncultivated land can be easily traversed in any direction on foot or with animals, and in vast areas even with wheels. The motor cars

that connect Damascus and Baghdad need no road in the desert. But how far could any kind of wheeled vehicle, or even a loaded horse, get in the forests of Europe without a road? Transportation in regions where the optimum climate for our kind of civilization prevails became as easy as in ancient Babylonia only when man had learned not only to protect himself and his goods from the rain, snow, and mud, but to make inns and prepare roads with reasonably dry surfaces. He had to learn also to travel on the snow with sleighs, snowshoes, or some other device.

Consider lastly the art of preserving food. It is easy to preserve food in a warm dry climate. In Egypt grain will keep six months or a year when simply piled in a heap on the ground and covered with a few inches of mud which quickly dries into a hard crust. To preserve it equally well in a cold, wet climate required experiment after experiment until man learned to build cornercribs, grain bins, and finally grain elevators. Grass for fodder can be left where it grows in dry climates, and is still good after six months. The hay of cool, wet regions must be carefully cut, dried, and stacked under a roof or in a barn.

This list of inventions and discoveries that have gradually enabled mankind to live comfortably, healthfully, and actively in regions with cold winters and much rain or snow might be indefinitely expanded. Our present skill in these respects has been acquired only through the combined efforts of millions of men, and through thousands of years of experiment. From century to century it has become more and more feasible to live comfortably and work creatively in cool, wet, stormy climates. Moreover, with each step toward the northwest on the way from Egypt to England, the stimulating and health-giving qualities of the climate have increased. Thus each new center of civilization has had the double advantage of the knowledge and skill passed on by its predecessors, and of a more stimulating climate than any of those predecessors enjoyed.

The Case of Greece.—Let us see how this theory of the migration of centers of civilization applies to Greece. According to the theory, the first step in making Greece the center of civilization was prolonged migration and consequent selection of an especially able group of people who ultimately invaded that country and became dominant in a region with reasonably good natural resources. For some centuries a rigid system of restricted marriage preserved the original high ability of the dominant groups, especially at Athens. The presence of such people helped the Greeks to profit by the inventions made in other countries as well as to make new discoveries of their

own. Hence the Greeks were better able to protect themselves against a January temperature averaging about 48° than the Egyptians had been against a temperature 10 or 15° warmer. Baghdad, however, has essentially the same winter temperature as Athens. The really significant difference between the winters of Greece and of the older centers lies in the rainfall. From October to March even dry Athens gets 12 inches of rain; Petras on the west coast of Greece gets 21, while at Sparta the figure rises to 24. Baghdad on the contrary, gets only 6 inches and Cairo 1. Thus the problem of protection from chilly winter rains is very real in Greece, but negligible in Babylonia and Egypt. The Greek climate must have involved great discomfort and ill health in winter until the art of building houses and making clothing had reached quite an advanced stage. This in itself would apparently have been enough to delay the full flowering of Greek civilization considerably after that of Egypt. When once the necessary protection has been achieved, however, the more humid type of winter is much more favorable to health than is the excessively dry weather of Egypt and Babylonia. This is proved by many comparisons between health and weather.

Another significant advantage of the more northerly location of Greece is that human health and activity are much less handicapped by a temperature averaging only 81° F. in July than they are by a temperature 10 or 15° higher in Babylonia and upper Egypt. Since Greece is dry in summer, its temperature is only a moderate handicap. Moreover, because Greece consists of so many islands and peninsulas, the heat is mitigated by seabreezes which are unknown in the continental areas of Egypt and Babylonia. Thus the intimate contact of Greece with the sea affords an advantage climatically as well as through opportunities for trade and for stimulating contact with other types of culture.

Still another decided advantage over Babylonia and Egypt is that even in our day the storminess of Greece, and hence the stimulating variability of the climate, are decidedly greater than in the earlier centers of civilization. Moreover, there is some evidence that from 1000 to 500 B.C., when Greece was preparing for its great outburst of mature glory, the storminess and rainfall were relatively high and this continued with little change until well after 300 B.C. If this was actually the case, both agriculture and human health and activity must have benefited. In connection with agriculture, it is worth noting that when Greece rose to its highest level a long series of improvements had gradually made it possible to cultivate not only alluvial floodplains where irrigation was easy, but dry plains and slopes

where there is no irrigation. Greece could not rise to the vanguard of civilization until this stage of progress had been reached.

Let us now sum up the Greek situation. We shall assume for the sake of argument that the leaders of Greece and Egypt were originally of equal innate ability. On this basis we should expect that in 500 B.C. Greece would have risen above Egypt in the scale of civilization for the following reasons: (1) Greece had the advantage of Egyptian and other cultural discoveries as well as her own. (2) Being less favorable than Egypt for primitive agriculture and for primitive human occupation in general Greece had not become overpopulated as had Egypt. (3) Greece, having long been merely on the edge of the cultural zones which centered in Egypt, had been especially subject to the inroads of fresh migrants who had come a long way. On this account the percentage of people who were descendants of the energetic, selected type of ancestors was presumably large. (4) The progress of the arts enabled the Greeks to live with reasonable comfort in cool, rainy weather that would have been most unpleasant as well as harmful to people with shelter and clothing as poor as those of the Egyptians. Thus they were able to enjoy the stimulus of a climate which is much more healthful and invigorating than that of Egypt.

Great as these advantages were, they did not prevent Greece from eventually declining. Overpopulation and the growth of a poor proletariat, the introduction of lower ideals of living, the breaking down of the old marriage restrictions among the more competent sections of society, the dilution of this same old stock by slaves, the restriction of its birthrate because of wealth and luxury, internal wars and the inroads of enemies, a deterioration in storminess and rainfall especially in the second and third centuries before Christ, and the introduction of the scourge of malaria all seem to have played a part in causing Greece to lose its old power, and hence to decline in population, wealth, and influence. In this process, just as in its rise to the pinnacle of fame, the biological, geographical, and cultural elements are so inextricably mingled that it is often impossible to disentangle them, and useless to attempt to say which is more important.

Other Examples.—A similar line of reasoning applies to Rome as compared with Greece. An average January temperature of 44° at Rome and a winter rainfall of 24 inches make a combination considerably harder to deal with than the 49° and 12 inches of Athens. But a July average of 77° in comparison with 81° helps to promote energy and the spirit of work much more than is often supposed. A greater prevalence of cyclonic storms and a more wholesome degree of humidity have a similar effect. Genoa, Florence, and Venice

differ climatically from Rome much as Rome differs from Athens, or Athens from Cairo. The northern Italian cities, therefore, did not become the most favorable localities until still greater cultural progress had been made. Vienna with an average temperature of 67° in July and 29° in January shows a still further improvement of climate but demands a corresponding development of the technique of living. There, however, the winter becomes so cold that even our present methods do not adequately cope with it.

Berlin with average temperatures of 65° in July and 31° in January, Paris (66° and 37°), and London (63° and 39°) come still closer to the optimum for people with the present European ability to protect themselves from the harmful effects of climate. The fact that these three greatest cities of Europe, rivaled only by New York, Tokyo, Moscow, and Chicago elsewhere, have climates so close to the optimum is highly significant.

The case of London is especially noteworthy. Today we find the Old World's largest city and greatest commercial, financial, and political center in the very spot where the geographic conditions would lead us to expect it. It will be remembered that so far as human material is concerned southeastern England has been the recipient of repeated incursions of people upon whom migration, persecution, or war have imposed a drastic selective process. Angles, Saxons, Norse, Vikings, Danes, and Normans; persecuted Flemings, Jews, and French Huguenots; ambitious Irish and Scotch, and in our own day expatriated but able Russians and Germans, have all brought real elements of strength to this part of the world. Culturally the situation is as favorable as racially. Each of these migrant groups, as well as many another, has brought its own contribution in the form of some special kind of skill, such as that of the Flemish weavers. The island position of England and its location on the Atlantic border of Europe and thus relatively near to America have also tended to bring cultural ideas and material wealth from everywhere. The basis for a great nation in natural resources such as agriculture, coal, and iron is also broad, even though food must now be imported.

Remember, also, that the climate of London is close to the ideal for health and activity in spite of the fogs. The ideal climate should be one in which the summer temperature and humidity are the optimum for physical health and the winter should show the optimum for mental activity. This is just what London has. So far as can be judged from measurements of health, factory work, comfort, and activity in many parts of the world, London's July average of 63° could scarcely be improved. The January average of 37° is almost exactly the outdoor temperature at which the people who have thus far been

investigated in both the United States and Europe appear to do the best work intellectually. With such a temperature, often frosty, but not cold at night, we can keep our bodies in excellent health by means of clothing, shelter, and other modern methods, and we can also get the maximum stimulus from the constant but not excessive changes which we experience by going in and out of doors, by opening or shutting windows, and by varying the degree to which we protect ourselves against the outside air. And finally the storminess and humidity of southeastern England come close to the ideal.

This sketch of the progress of civilization from Baghdad to London indicates that at each stage of history the center of culture has been located where migration, racial selection, natural resources, and climate have combined to make people most competent in cultural achievements. Thus not only the location of the earliest great centers of civilization, but also the march of these centers northwestward, appear to be the consistent result of the interplay of geographical environment, man's innate biological characteristics, and the accumulation of a great heritage of human culture.

What of the Future.—At this point the question of future centers of civilization arises. Will the center shift still farther north to Scandinavia? Will it move eastward to cooler regions such as Russia? Will it stay where it is? Or will it perchance move once more to lands that are warmer? In answering these questions the following major results of the preceding pages must be carefully kept in mind. First, although the centers of civilization have shown a tendency to migrate to cool regions, there has been an even stronger tendency toward regions which are stormy. The most desirable condition appears to be an abundant but not excessive rainfall evenly distributed at all seasons of the year, and constant but not extreme changes of weather from day to day. Such conditions are the best both for agriculture and for human health. The only part of the world that surpasses the North Sea region in the variability arising from cyclonic storms is the northeastern United States, but there the extremes of temperature both in summer and winter may counteract whatever gain arises from greater storminess.

Second, in the earliest days of civilization the optimum climate was determined by the conditions of winter, but now summer is more important. In other words the earliest centers of civilization arose where the winters were as cold as the people could comfortably stand. The summers, so to speak, were left to take care of themselves. Today the main centers of civilization are located where the summers are most nearly ideal, and the winters are taken care of by artificial means of heating. If man should learn to protect himself perfectly from

cold, dry weather, his health and activity might be as good in Russia as in England, but thus far our best efforts still fail in this respect.

Third, although data are still scanty, the climatic optimum for mental activity appears to occur at an average outside temperature of about 40°. The regions near the North Sea, Puget Sound, and New Zealand, and some islands like Nantucket are the ones where there is the closest approach both to the optimum temperature for physical health in summer and the optimum temperature for mental activity in winter. It is difficult to see how any other part of the world could rival them in temperature no matter how fully man may learn to control his physical environment artificially.

The fourth feature of our discussion is that the centers of civilization tend to grow up not only in regions with stimulating climates, but also in those where recent migration into relatively unoccupied areas has led to an intensive process of natural selection. In this respect new lands like the United States, Canada, and Australia seem to be the logical successors to the North Sea region.

Finally, new cultural conditions have played an indispensable rôle in determining the march of civilization. It is possible that a new social and economic system in a country like Russia or China might be so superior to the present systems that those countries would forge to the forefront of civilization. It appears to be the rule, however, that all sorts of new ideas, no matter where they originate, are used most effectively in the regions where the combined effects of innate biological character and climate lead to the greatest activity. If such is the case, it is probable that western Europe and the United States will quickly seize any advantages which may accrue from a new social system or other improvements in Russia or anywhere else.

In view of all this, it may be legitimate to conclude that in its progress to cooler and stormier climates the center of civilization is now in course of jumping across the Atlantic to the northeastern United States. Nevertheless, although this part of the world is wealthier and more active than the North Sea region, there is no proof as yet that it is superior either in climate or human material. The most that can be said is that in both climate and people the two differ more than is usually realized, but that in spite of this they form a single great center of civilization broken in two by the Atlantic Ocean. They are united by the storm belt which sweeps across them both, and is here more highly developed than in any other habitable region. When the advantages of mineral resources, agriculture, and waterways are added to those of climate, it is hard to see how any other large region can surpass these two unless some great change takes place in the innate ability of the people.

CHAPTER XVIII

NORTHWESTERN EUROPE: DENMARK AND ICELAND

Fennoscandia.—The three Scandinavian countries and Finland are often combined into one group called Fennoscandia. The factors which make this desirable are ethnographic and cultural rather than economic and physiographic. Nevertheless many economic resemblances can be observed, and physiographically the Ice Age is an important factor in the relief of all. The main uniting link, however, is that we have here the nucleus of the Nordic race and that the cultural development of all four countries has been similar. The remarkably high level of this culture doubtless owes much to racial inheritance, but even more, perhaps, to the geographical environment, especially the location and climate.

Likeness of the Three Scandinavian Countries.—Let us compare Denmark, Norway, and Sweden more closely. All three are located on peninsulas with drowned coasts and are correspondingly influenced by surrounding bodies of water. This has led many of the inhabitants toward fishing and seafaring, which in Norway have become the outstanding economic factors. Although the local climatic details differ greatly, especially between the Norwegian and Swedish sides of the Scandinavian Highland, and between the most southern and most northern sections, the influence of the numerous cyclonic storms is everywhere a vital factor in explaining the energy of the population. Furthermore, in spite of high latitude, the climate is nowhere unsuitable for mankind; and crops can be raised far north within the Arctic Circle.

The land of the three Scandinavian countries is used mainly in two ways—for forests and for dairying. The vast coniferous forests that cover most of Sweden and southeastern Norway in the Oslo region are a response to the relatively continental climate and thin soil of the eastern slopes. The dairy industry with its crops of hay and fodder is found chiefly where the more marine type of climate prevails and especially where this is combined with good glacial soils as well as with the advantages of a nearby market. In Denmark it reaches a level unequaled in any other section of Europe. Food grains, how-

ever, are not sufficient to feed the population in any of the three countries, and much of what is consumed is imported.

Geological structure causes Norway and especially Sweden to differ greatly from Denmark in mineral resources. Nevertheless, except in central Sweden, metal industries have not developed to a high degree and most of the ore is exported to countries where coal is available. Hence, except in certain specialized Norwegian industries where power is a great factor, the main industrial development is based on the products of the land, especially forestry and dairying. In addition, of course, local community industries such as printing, machine shops, and the preparation of food are highly developed as in all very progressive countries.

One of the greatest resemblances of the three Scandinavian countries is their almost pure Nordic stock. Only here and there do scanty remnants of a former population exist, and only in the far north where dwell the Lapps is any large area thoroughly non-Nordic. Otherwise one type of language, of religion, and of government prevails everywhere, for all three countries are Protestant and are democratic kingdoms. A study of the many general maps illustrating the introductory chapters, especially Chapter I, shows that all three countries have the high cultural level of Europe A as exemplified in a low deathrate, almost no illiteracy, and high yields of crops. To this can be added other rather typical features of Nordic culture such as a high level of education, architecture, literature, and music; another uniting factor is the strong inclination toward co-operation. The density of population is low except in Denmark and most of southern Sweden, showing the unfavorable results of relief and former glaciation.

In their historical development, each of the three Scandinavian countries has had a period of greater power and extension, and political unions of more or less strength have often brought two or all of them together. With Holland they today form a Nordic bloc which stands strongly for stability and peace in Europe. All over the world the name Scandinavia stands for high culture, and the many Scandinavian emigrants have considerably strengthened this reputation in other parts of the world.

Relationships of Finland and the Baltic States.—In most respects Finland attains much the same high level as Scandinavia, and deserves to be included in the same group. Here, however, a transition towards the more backward conditions of eastern Europe is recognizable, especially along the eastern border in Karelia. Moreover, the Finnish racial stock and language differ from the Scandinavian, although Finland contains a large number of Swedes.

The inclusion of the Baltic States as part of northwestern Europe is far more debatable than that of Finland. These states show in many respects a sharp decline, especially in the more southern parts (Lithuania). Nevertheless, they show more affinity to Finland than to any other part of Europe, and they may properly be put with Fennoscandia to form a Baltoscandian group of countries. Sten de Geer, distinguished Swedish geographer, has rated all these countries as to their Nordic characteristics. Using different criteria, his rating is as follows: Norway and Sweden 9-8, Denmark 8-6, Finland 9-6, Estonia 7, Latvia 6-4, and Lithuania 4-2. These ratings correspond very well with the results obtained in our introductory chapters.

✓ *Denmark*.—Denmark resembles Holland, Belgium, and Switzerland. It is one of those small European countries which are true representatives of the high cultural and economic level of Europe A. All four are countries whose small area and small population (three and one-half million in Denmark) by no means correspond to their influential position among the countries of the world. Nevertheless, Denmark is very different from the other three countries. It lacks a colonial empire like that of Holland, and it has no superb location at the mouth of the Rhine to encourage commerce; it has no coal to help it toward an industrial development like that of Belgium, nor can it boast of mountains like those of Switzerland to provide a refuge for the oppressed and a means of attracting not only tourists but also residents of a high type at present. Denmark, in fact, is very poor in natural advantages other than climate.

✓ The modern prosperity of Denmark is based on its cows, pigs, and chickens, which provide the great Danish export products—butter, milk, bacon, and eggs. This may sound rather prosaic, but nowhere else do the cows give more and richer milk, nowhere else has bacon reached such perfection, nowhere else is the freshness of the eggs so universally shown by stamping upon them the date when they were laid.

This successful specialization in animal industry has been possible only through co-operation, which stands back of every pound of butter or bacon and every egg, giving Denmark a reputation for products of high quality. Still this one-sided development contains elements of danger, especially as the sale is mainly to Great Britain. If the British should exclude the Danish breakfast products in favor of those of the British dominions (New Zealand, Australia, and Canada), Danish industrial life would be ruined. There is a good deal of truth in the jocular suggestion that Denmark would do well to ask for inclusion in the British commonwealth.

Politically, Denmark, like Holland, owes its independence largely to the fact that it controls the outlet of an important body of water—the Baltic. For the peace of Europe it is important that a neutral power control the Baltic gateway. In the naval aspects of the World War Danish neutrality was a deciding factor because it prevented the German fleet from entering or leaving its secure retreat except by way of the Kiel Canal. It was far easier for Great Britain to block the mouth of the Elbe than it would have been to patrol the entrance to the Skagerrak. In former days Denmark levied dues on all ships entering or leaving the Baltic. This has long ceased, and many ships pass Copenhagen without stopping. Nevertheless a great many still stop and in one way or another contribute to the wealth of that city. The location of Denmark puts Copenhagen at one of the focal points of world trade. In spite of the Kiel Canal, the existence of Denmark decidedly reduces the maritime power of Germany.

Relief and Rural Industries: The West.—Denmark is so flat that its relief as well as its soil is largely due to glaciers of the Ice Age. Except in a few places glacial deposits in the form of hilly moraines, sheets of till, or sandy plains bury the underlying rocks entirely. During the main period of glacial time Denmark was entirely covered by ice, but toward the end the front of the icesheet extended nearly north and south (A53) along Jutland, as the Danish Peninsula is well called. (During the long time that the ice remained stationary, it deposited a great amount of morainic material, giving central Jutland a typical moraine landscape. Here hills as high as 600 feet, often with lake-filled depressions between them and forests of fir and pine on the slopes, lend variety to one of the most attractive parts of a country which is otherwise very flat.

To the west of the moraines which stood in front of the former glacier, lies the outwash plain, a sandy lowland marked by moors and covered with heather on the higher parts. A row of dunes borders the iron coast, so called because of its danger for shipping in times of storm. Except in the south there is none of the fertile marine clay which in Holland and Germany accumulated in a lagoon between the dunes and the sandy upland.

The dunes have been broken here and there by exceptional storms, and lakes have been formed behind them. The Liim Fiord which cuts entirely across the peninsula and makes the northern part (Skagen) an island is due to a combination of such marine invasion and a structural depression by means of which the sea extends from the east coast through a narrow entrance into the interior. Such a fiord should not be confused with those of Norway, for the Danish fiords are much

wider than the Norwegian. Because of its shallowness, especially at the western entrance, the Liim Fiord is useful as a passage for only small boats, but it plays an important part in the plaice fisheries. Skagen is of slightly higher relief than the mainland, and Cape Skagen with its dunes and sandy bars resembles Cape Cod. It is gradually growing out into the sea thus separating the deep Skagerrak from the Kattegat, the inland sea between Jutland and southern Sweden.

In the south in Schleswig, of which the greater part belonged to Germany until 1918, the line of dunes disintegrates into a number of islands with passages between them. These islands mark the northern extension of the chain starting in Holland and continuing along the coast of Germany, all well known as summer bathing resorts. The sheltered channel behind the islands is very shallow. At its northern end lies the only significant harbor on the west coast of Denmark, Esbjerg, whence fast ships ply to England. Even there the harbor is artificial and was built at great expense.

Kitchen middens, or heaps of shells, indicate that the earliest inhabitants of Denmark lived along the coasts and the lake shores. The inhabitants were probably fishermen at first, but when agriculture and stock-raising were introduced they went inland, choosing the lighter soils of the moraine country for their crops. Later on they moved gradually to the heavy, loamy soils of eastern Jutland and the islands, which became, as they still are, the most productive part of the country, leaving most of Jutland as a domain of forests or else of moors where sheep browsed on the heather.

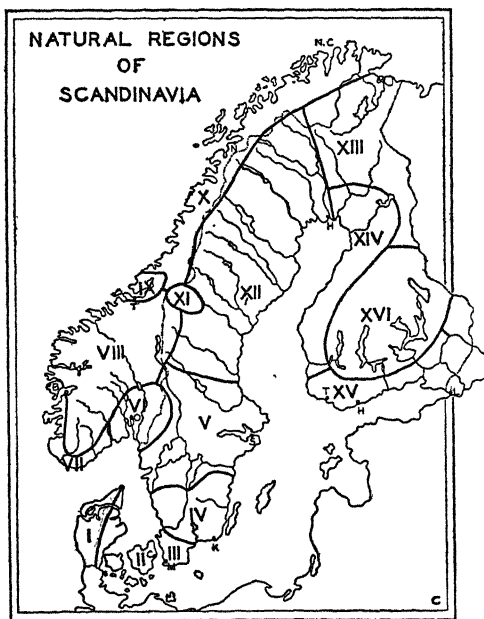
The soils here in western and central Jutland (region I in A232) vary in fertility, but are for the most part sandy and rather poor. The modern use of fertilizers and the growth of the dairy industry, however, have now made it worth while to cultivate even this sandy area (A237). Oats, rye, and potatoes are the main crops, but grass-land is very important and dairying predominates, while sheep still retain a place in rural activity. Nevertheless, the intensity of production is by no means like that of eastern Denmark. On a detailed map of the density of population most of this region is conspicuous for sparsity.

Eastern Denmark.—East of the terminal moraines the landscape changes. The relief is rolling, with low hills (up to 400 feet) between depressions due to the glacial erosion of the underlying limestone. Hilltop remnants of the former universal beech forest, little lakes in the hollows, deeply penetrating arms of the sea, and comfortable, neat, low, white farmhouses embowered in trees all add to the attractiveness of the scenery.

After the retreat of the glacier, a direct land connection existed between Jutland and Sweden. A subsequent sinking of the land, however, provided an outlet for the Baltic lake, and the present islands are all that remain of the former land bridge. The coastline, in contrast to that of the west coast, is extremely irregular. Innumerable bays and gulfs represent old valleys now partially submerged in the sea. The Little Belt, or strait between Jutland and the island of Fyen, the Great Belt farther east between Fyen and Sjælland on which lies Copenhagen, and "the Sound" between Sjælland and Sweden are

drowned valleys of rivers which once flowed north from Germany towards the Atlantic.

(This region (number II in A232) is the most productive part of Denmark. Here are the best meadows and the most productive fields of oats, two-row barley, and root crops, as well as wheat and sugar beets. Very high yields per acre show not only good soil and very intensive, intelligent cultivation, but also a very favorable combination of rainfall and temperature. It was here that co-operation made its first great strides in helping the Danish farmers in the second



A—Natural Regions of Fennoscandia.

part of the nineteenth century. It enabled them to overcome the difficulties arising from the temporary loss of Schleswig-Holstein, the competition of cheap grains from overseas, and the new protective tariff of Germany, which until then had been Denmark's principal export market. Co-operation has almost made eastern Denmark one great industrial plant specializing in a few agricultural products for export.

The importance of agricultural co-operation in Denmark can be realized from the fact that 90 per cent of all the area devoted to dairy products belongs to members of co-operative dairies and 70 per cent of all the bacon is produced by co-operative butcheries. No less than

430,000 farmers belong to export co-operatives mainly for dairy products, bacon and eggs; and import co-operative societies which mainly bring in stock feed and fertilizer number 140,000 members.

Eastern Denmark also contains most of the main towns, which are chiefly small coastal agricultural markets, and fishing towns to which herring, mackerel, and cod are brought. Aside from Copenhagen only Aarhus on the Jutland coast and Odense in Fyen have over 50,000 inhabitants. Copenhagen, however, with almost one quarter of Denmark's total population is one of the world's chief cities. In no other country except artificial Austria—not even in France—does the capital play so large a part in the country's economic, political, social, and cultural life. Copenhagen is not only Denmark's chief port but also the center of manufacturing. It combines such antipodal products as high-class porcelain (for which kaolin is brought from the Danish island of Bornholm in the Baltic), margarine (used extensively instead of butter), and beer.

The city with its Nordic architecture and pleasant suburbs like those of American cities is very beautiful. Suburbs of this kind where one-family houses stand amid lawns, trees, and gardens are so rare in Europe that they are called "garden" suburbs. Here, as in Holland, tens of thousands of people use bicycles to carry themselves to and from their work. The famous sculptures of Thornwaldsen, and historic castles such as Fredericksborg and Elsinor at the entrance of the Sound, add to the attractiveness of Copenhagen. Europe's most famous pleasure garden, Tivoli, is only one of the many places that take care of entertainment. The transportation problem arising from the island character of eastern Denmark has been solved by the use of large ferryboats which carry railroad cars. Regular lines connect Copenhagen with Jutland as well as with Germany by way of Warnemünde.

The Faröe Islands and Iceland.—Two outliers of Europe should be discussed with Denmark. The Faröe Islands, belonging directly to Denmark, are important only for their fish, mainly cod. Thorshavn, the capital, is dormant except during the fishing season. Iceland is no longer a part of Denmark, but is an independent state, which acknowledges the Danish king. As it has been omitted from most of the general chapters, it seems advisable to say a little more about it here.

Although Iceland is more than twice as large as Denmark, it has only about one inhabitant for every thirty-five in Denmark. No other civilized country is so sparsely populated, nor is any other so poor. The reason for this is that Iceland has practically no natural resources

except grass and fish. A large part of the island is too rugged and volcanic for occupation, even if the climate would permit. The main trouble, however, is that high latitude and high altitude combine to make most of Iceland too cold in summer for any vegetation aside from Arctic lichens and mosses. Around the coast, however, and in the lower valleys there is a belt of grass. Trees are almost unknown, and there are no crops except a few potatoes, turnips, and cabbages. Practically the only reliable way of getting a living on the land is by using the grass as pasturage for sheep and sometimes cattle in summer, and storing up hay for them in winter. Accordingly Iceland has about six sheep for every person—more than any other country except Australia, New Zealand, and Uruguay. The export of wool and mutton to Europe is one of the two chief sources whereby the Icelanders procure food and practically everything else from abroad.

The waters around Iceland are full of fish, especially cod, and the cool climate makes it easy to preserve them. The many little bays and the inhospitality of the treeless land tend to drive the Icelanders out to the sea for a living. Hence fish not only form a major part of the Icelandic diet, but also provide about two thirds of the exports. One or two other resources have played a very minor rôle in Iceland's development but may be more important later. A little of the rock crystal known as Iceland spar is exported, some waterpower has been recently developed, tourists have begun to find Iceland interesting, and iron ore and sulphur may some day be exploited. Thus far, however, during the thousand years of Icelandic history, sheep and fish have been practically the only resources except at first, a thousand years ago, when more favorable climatic conditions appear to have permitted the growth of both forests and crops.

Even the sheep and fish have not been steadily reliable. During certain periods such as the fourteenth and eighteenth centuries exceptionally cool, wet summers made it impossible to cure hay for the winter. Hundreds of thousands of sheep therefore died. At the same time the unusual storminess made it unusually difficult and dangerous to catch fish, so that the supply was low. Volcanic eruptions have also been an intermittent curse. As a result of all this there have been periods when famine, disease, and accident reduced the population to half or perhaps a third of its normal level, and the economic conditions were truly abject.

In spite of all this, Iceland, for a thousand years, has stood in the forefront of intellectual progress. Long ago the famous Icelandic Sagas, some of the world's choicest literary masterpieces, were written here. From the introduction of Christianity down through such steps

of progress as the invention of printing, modern hygiene, and the use of electricity, the Icelanders, in spite of their poverty and isolation, have kept pace with their Scandinavian relatives in Europe. Among the leaders mentioned in the *Encyclopaedia Britannica*, Icelanders, in proportion to the population of their country, outnumber every other non-English-speaking group. Today with a population no larger than that of the little metropolitan district of Altoona in Pennsylvania, Iceland maintains an unusually good system of education embracing practically every phase from top to bottom. Education is universal; and no country in proportion to its population does more in the way of scientific research, historical criticism, and social reform. Reykyavik, the capital, although it contains a quarter of the population, is only a little village-like city with twenty-five or thirty thousand people. There is little sign of wealth or of great business activity, but abundant evidence of high intellectual, social, and moral standards.

The reasons for the high standing of Iceland in spite of its poverty of resources are mainly two. One is that Iceland was first settled by a selected type of people, the more peaceful and thoughtful among the upper classes of the Vikings, together with the more reliable of their retainers whom they chose to bring with them. Practically no other immigrants have come to Iceland, and the life there has been so strenuous that weaklings in either mind or body have been eliminated. Hence the present population is of unusually high quality biologically. The other reason is that the climate, although too cool for agriculture, is excellent for man and especially for intellectual activity. Thanks to the Atlantic Drift the winters on the south coast where most of the people live, are no colder than in New York. The summers are indeed too cold for crops, but they are the kind that keep people very active and healthy. Thus Iceland furnishes an unusually good example of the part played by diverse factors in fostering civilization. An isolated location off the main lines of travel and in stormy seas, a rugged relief with many volcanic eruptions and earthquakes, a climate too cool for agriculture, and a great dearth of mineral resources are factors which not only keep Iceland poor, but prevent it from having a dense population and from having great influence on the world as a whole. On the other hand, the high biological quality of the people, a climate that is unusually stimulating to intellectual activity, and sufficient contact with the rest of the world to bring in new ideas have enabled the country not only to do great things in proportion to its size, but even to advance steadily and remain in the forefront of civilization.

CHAPTER XIX

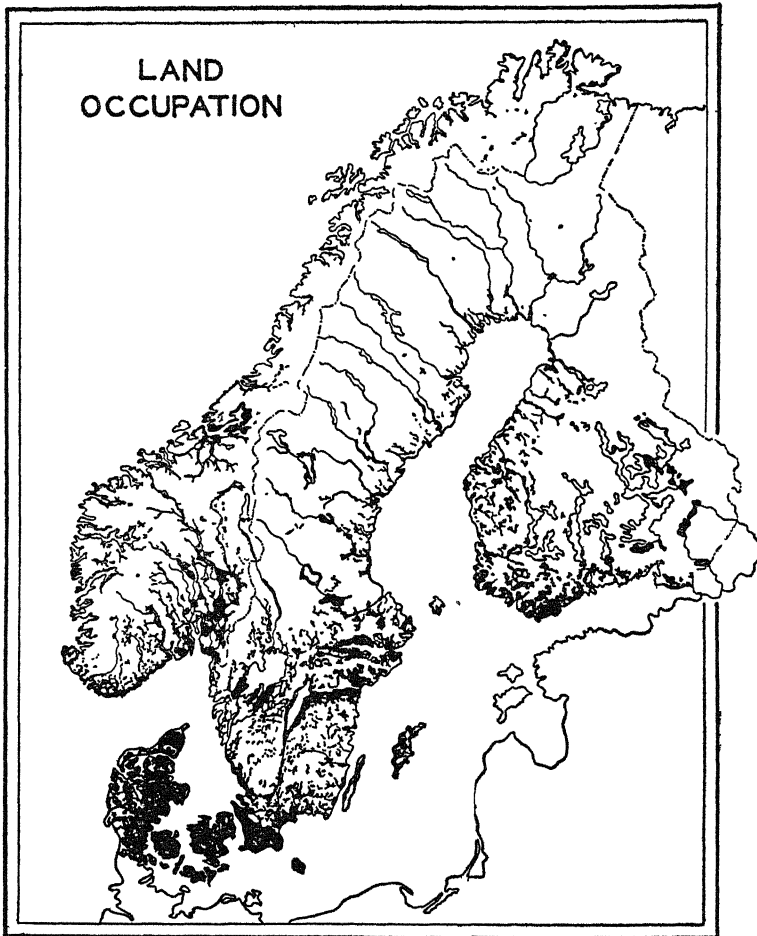
NORWAY

The Land and the Sea.—Norway is Europe's most inhospitable land, 73 per cent being unproductive and 24 per cent in forest, leaving only 3 per cent of cultivated land and grass (A237). In Chapter III this fact is developed fully, and the attraction of the warm, well-protected coastal waters, resulting in fishing and seafaring, has been contrasted with the unfavorable condition of the land itself. Fishing is still an important occupation, engaging directly one sixth of the men and providing one third of the nation's exports. Closely associated with this is the fact that the Norwegian fleet, comprising between 4 and 5 per cent of the world's shipping, and relatively ranking first, still carries on the worldwide voyaging that is its Viking heritage. In the face of these more dramatic pursuits, it is easy to forget that the foundation of Norway's economic life is after all the land, that agriculture and forestry continue to be the mainstay of the people, engaging more than one third of them. Furthermore, later years have seen a great development of manufacturing, based partly on the raw products of forestry, mining, and fishing, and also on nature's great gift to Norway, its abundant waterpower.

Relief.—Norway is a country of high mountains and plateaus. In Chapter III we saw how northern Europe during the Alpine period was subjected to pressure which especially affected the regions of comparatively weak structure. The present Scandinavian mountains represent such a weak section where an old penepained mountain region was uplifted, warped, and again exposed to the erosion of ice and water.

As a whole the mountain system of Scandinavia represents a huge mass of land, high on the west and dipping toward the east, and bordered there by the syncline of the Baltic Sea. The western edge of the mountains breaks off rather abruptly, facing the Atlantic; the eastern flanks slope gently down to the Baltic. Norway includes the greater part of the mountain system proper and its western border, but of the eastern slope only the southeastern part, the region around Oslo.

The uplifted mountain block shows the marked effects of erosion. During the Ice Age it was the source and center of the great Scandinavian glacier, and even now the high parts are still so protected by ice that the pre-glacial, uplifted peneplain remains more or less intact. So the mountain forms are smooth and rounded, like the Hardanger



A.—Used Land in Fennoscandia. Only the shaded areas are cultivated.

Viden and Dovre Fjeld; and even the highest summits, such as the Galdhøppigen, which attains 8,500 feet, are by no means outstanding features of the landscape. Only in a few places like Jotunheimen do the peaks display steep Alpine forms due to the erosion of moving ice and perhaps to peculiarities of rock formation.

The sharp western edge of Norway was broken by great fissures during the period of uplift. The rivers, followed later by ice, have remodeled and widened these into the famous Norwegian fiords some of which, like the Hardanger and Sogne fiords, extend far inland. Thousands of rocky islands border the coast, offshoots of the mountainous mainland. The change that has taken place in the relationship of land and sea may be mainly the result of a sinking of the land under the pressure of a vast ice mass, but at least part of it must have been caused by a rising of the sea in consequence of the addition of water from the melting of continental glaciers. At present Scandinavia is rising very gradually, in belated response to the loss of its thick burden of ice, for the earth's crust reacts very slowly as we measure time. Successive terraces along the coast show wave-cut benches where former shores have been uplifted.

In the south the mountains do not come so near to the ocean as in the most westerly part of Norway. There the precipitous cliffs give place to lowlands of typically glaciated character, with rounded rocky hills and intervening marshlands. In central Norway the Trondheim (Trondhjem, pronounced Tronyem) depression makes it easy to pass from Norway to Sweden. This is not merely a depression in the axis of the mountain range. It is a place where erosion has been especially effective because a softer limestone is exposed, thus producing a physiographic feature marking the northern limit of the southern plateau. Farther north the mountain system has more nearly the character of a single continuous chain, breaking steeply toward the west and dipping moderately eastward. The main divide is in places very near the Atlantic Coast.

The Oslo region is entirely different. The mountains slope gently to the east, and broad river valleys, glaciated depressions, and lakes characterize the landscape. The ice diverted several rivers which once flowed eastward into what is now Sweden, and Oslo became the center of a great number of valleys which radiate in all directions. The boundary between Norway and Sweden is not physiographic, and the same sort of topography is seen on both sides of the frontier. In a physiographic sense, the Oslo region may almost be called Swedish rather than Norwegian.

The soils of Norway are generally poor, for the glaciers caused denudation much more widely than deposition. However, the coastal zone of south and southeast Norway contains some marine deposits of relatively high fertility, laid down at the time of high sealevel immediately following the Ice Age. The Oslo and Trondheim regions also enjoy soils better than the average, on account of the presence of

eruptive rocks west of Oslo and of limestone in the Trondheim depression.

Climate.—Climate plays so great a part in Norwegian life that it will be discussed here in some detail. Norway stretches from south to north through more than 30° of latitude, a circumstance which would naturally lead one to expect great differences between the northern and southern extremities. But the temperature maps (A240 and A241) show that this is not the case. More important than mere latitude are the prevalent west winds and the presence of the Atlantic Drift. These not only prevent freezing along the west coast clear to the North Cape, but also increase the supply of moisture.

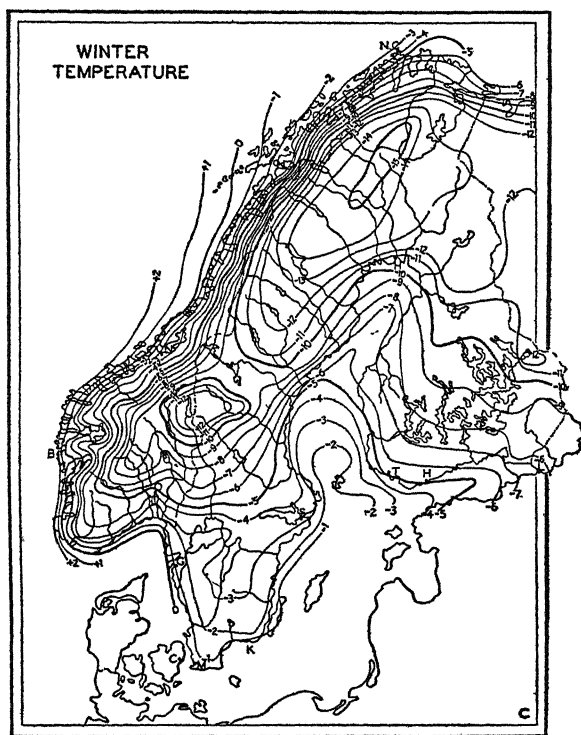
Because of all this, the west coast of Norway, particularly in winter, has an extremely marine climate. Freeholmen, the most northerly climatic station of the country, located far inside the Arctic Circle, has an average temperature of 26° F. during February, which is there the coldest month because the sea causes a lag in the seasons. Skomvar, a station on the Lofoten Islands, records 31° F. South of Trondheim the average winter temperature remains above the freezing point, as for instance at Aalesund, in latitude 62° N., showing 35° for February. In the mountains back from the coast, lower temperatures of course prevail; but in comparison with other regions of the same latitude and elevation they have very mild winters. Storlien (2,000 feet) on the gap between Trondheim and Sweden has an average February temperature of 16° F., showing the inflow of Atlantic air through the break in the mountains, but the eastern slopes are colder in proportion to their altitude. Oslo averages 25° F. in February, still showing the marine influence.

In summer the oceanic influence is slight but is still apparent. Thus the July temperature of Bergen on the west coast averages 60° F., while that of Oslo, a little farther south, and east of the mountains, is 65° F. The difference in temperature due to latitude is very slight, for the length of the summer days in the far north helps to maintain an average of 55° F. for July even within the Arctic Circle.

The rainfall of Norway (A36) is influenced by the same factors which affect temperature. Along the west coast, precipitation is very heavy, especially in the southwestern section (Bergen, 87 inches), but even in the far north it exceeds 25 inches. The distribution is fairly uniform throughout the year in the north, but in the south there is a minimum in early summer, and a winter maximum. In the mountains the precipitation diminishes, especially on the eastern slopes. Oslo in the eastern lowland has about 24 inches, less than a third of the rainfall at Bergen.

In addition to temperature and precipitation, the amount of sunshine is of great importance. Following the comparative darkness of winter comes summer with long days; in the northern section the "midnight sun" may be seen in the sky throughout the whole day for several weeks, and even in the south the summer nights are very short, and crops are thereby considerably favored.

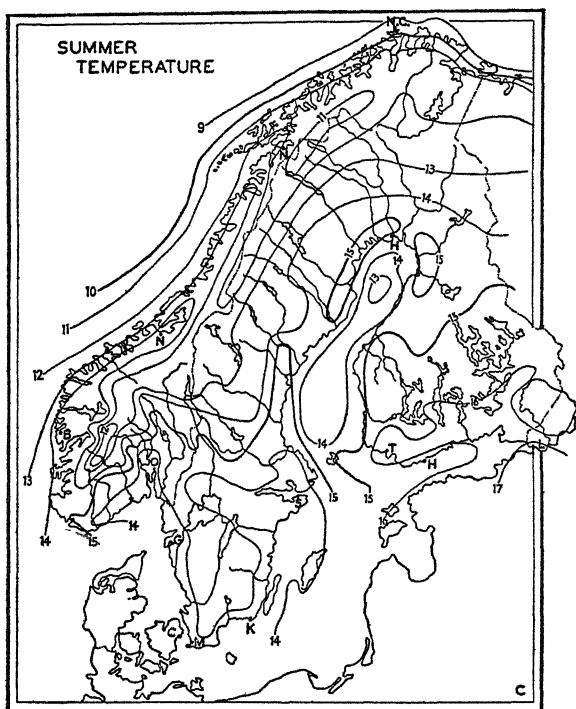
Natural Regions.—Starting in the north, region X in A232 consists of a mountain range with a rocky, island-bordered coast. Lack



A—Winter Temperature of Fennoscandia

of level land and unfavorable climate limit agriculture to a little hay, barley, and potatoes around the coastal villages. Only in the southern part of northern Norway, where the longitudinal valleys of the Trondheim region lie some distance inland from the coast, does agriculture become at all important. Most of northern Norway, however, is mountain upland, where glaciers at some points extend down to the sea. Still the coastal population is comparatively dense, if the high latitude and lack of arable land are taken into consideration (A242).

Fishing is the chief economic activity of northern Norway. Off this coast lie the winter fishing grounds for cod. The winter fishing begins first in the Lofoten section and continues there until March. Later a second but less important fishing period opens farther north in Finmarken. Cod are exported partly as "stock" fish, dried on poles, partly as "clip" fish, dried on rocks. Cod-liver oil is extracted and shipped away in great quantities. Its production varies widely from year to year according to size of the fish and the oily content of the livers.

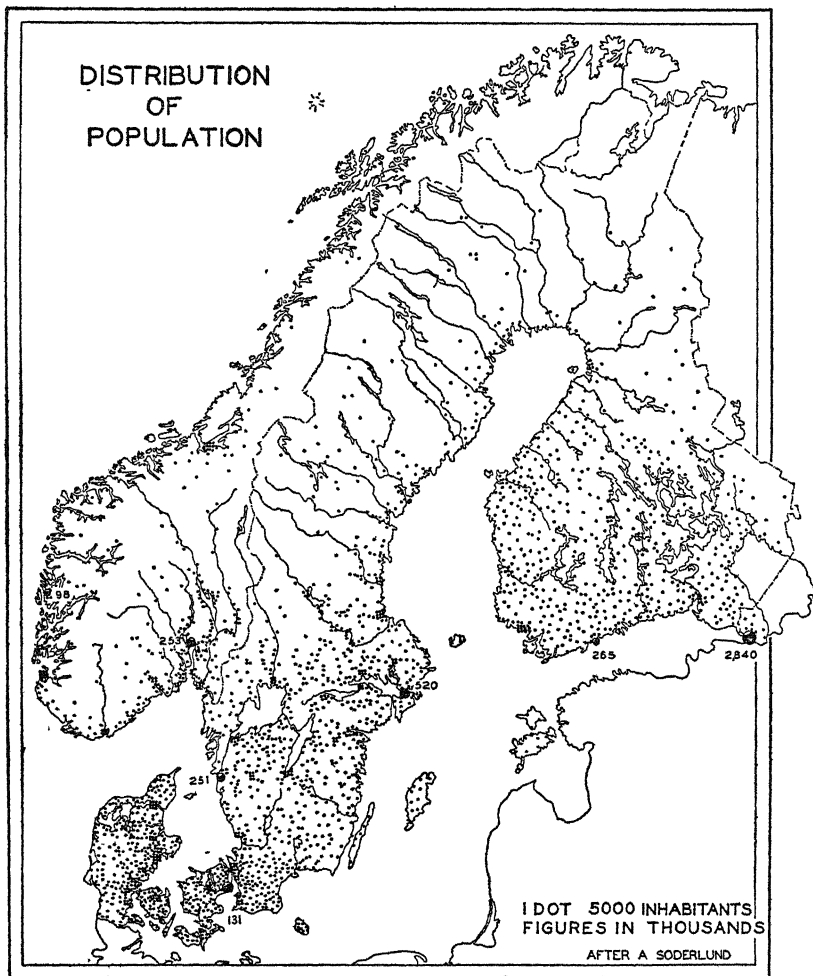


A—Summer Temperature of Fennoscandia.

Two other factors bring life to this northern region—the outflow of Swedish iron ore from the ice-free harbor of Narvik and the mining of iron ore in the extreme northeast at Kirkeness. Pyrites also comes from the mountainous region of northern Norway. Most of it is exported.

Of the many small coastal settlements, Tromsø, close to latitude 70° N., is the most important, and Hammerfest, still farther north, is often mentioned as the world's most northern city. Frequent sum-

mer cruises to the North Cape from the United States, as well as from western and central Europe, have made many points in northern Norway well known, and the resulting tourist trade is an added source of income.



A—Distribution of Population in Fennoscandia.

Norway also extends into Lapland (region XIII of A232), which will be treated with Finland. Lying east of the main divide and being of lower relief than the west coast, it offers good grazing ground for the sixty thousand reindeer more or less which in summer migrate thither from the neighboring countries.

The Trondheim region (number IX) is here mentioned separately because its softer rocks have been eroded to a more rolling relief than prevails elsewhere in most of Norway. This not only offers suitable conditions for hay, oats, barley and potatoes, but also permits the growth of forests which form an additional source of rural income. Large prosperous-looking farms show that man has solved here the problem of living comfortably in a latitude of almost 64° N. The city of Trondheim located on the Trondheim Fiord at the junction of two great lines of transportation, one south to Oslo and one east to Sweden, is the world's most northern city with a population above 50,000. Once the capital of Norway and center of Viking activity, it is now a quiet city with a magnificent cathedral, a relic of former glory.

Region VIII comprises the south Norwegian uplands. Except for its lower valleys and the coasts of the fiords, it is almost uninhabited (A242). Only two railroads connect the coast with the Oslo region: one, a branch of the Trondheim line, follows a valley depression; the other, the Bergen-Oslo masterpiece of engineering, crosses the Hardanger Fjeld. Small towns and villages border the fiords and combine the profits of fishing with the meager results of raising a few crops and livestock on the available bits of level land.

The two remaining regions, southwest Norway (number VII) and the Oslo region (number VI), are Norway's most productive portion, and contain half the total population. There is, however, a great difference between the two. In southwestern Norway the fishing industry is still of outstanding importance. Cod, herring, and mackerel are caught in large quantities, and the fish market of Bergen has an international reputation. Connected with the fishing are the canning and conserving plants which use Mediterranean olive oil and tomatoes exchanged for exports of fish. In the hinterland there is more or less farming, with oats as the leading grain by far, and great numbers of dairy cattle as the main source of income. Forests cover the lower hills, and the water of the many rivers is used for large power plants and industrial enterprises. Bergen, the largest city, is built between two fiords and climbs up the slope of the adjacent hills. It is the principal fishing and trading harbor on the west coast. Another city worth mentioning is Stavanger, well known for its fish. Here, as elsewhere along the Norwegian coast, most of the transportation goes by coastal steamers, which connect all towns and settlements. A regular line runs all the way from Oslo to Kirkeness on the Varanger Fiord at the extreme northeastern corner of Norway. The better-populated sections have frequent connections with the large neighboring centers.

The Oslo region (number VI) has already been described as entirely different from the rest of Norway. Along the coast, fishing remains a source of income, but agriculture comes first. A237 shows that we find here most of the occupied land. The hilly divides between the radiating valleys are covered with coniferous forest, a response also to the less marine climate. Here, accordingly, we find most of Norway's sawmills and pulp and paper mills. The almost unlimited amount of power here, as in the southwest, permits Norway to rank third among the countries of the world as a producer of aluminum, and also to extract nitrogen from the air and sell it in the form of Norwegian saltpetre. Iron is produced by electric smelting processes.

Oslo, Norway's capital, at the northern end of the Oslo Fiord, is the geographic center of this most populous part of the country. From here two railroad lines connect Norway with Sweden, one going to Stockholm, the other to Göteborg, and thence toward central Europe. The city itself lacks the historical attraction of some of the towns on the west coast. It has always been more open than the others to outside influences, mainly Danish and Swedish, but it is the real center of Norway both politically and culturally.

Oslo is also Norway's most active seaport. The nature of the Norwegian exports as a whole has been made clear in the preceding treatment. The imports, as is usual in the countries of northern Europe, consist of food products (grains, sugar), textiles, and all kinds of manufactured goods. A612 shows that Great Britain is the greatest buyer of Norwegian exports, while Great Britain and Germany are of equal importance as sources of imports.

History and Summary.—The early settlement of Norway began around Oslo and Trondheim, and extended along the coast between these two regions. Since fishing is by itself an inadequate means of support, the population has been limited by the conditions of soil and relief which restrict agriculture. Periods of temporary overpopulation have been consequently recurrent, and these in turn are reflected in the expeditions of the Vikings, in the colonization of Iceland and Scotland, as well as in later migrations to the United States.

The twelfth century was the period of Norway's greatest national expansion. The sparsity and scattered location of the population, however, the difficulty of overland travel, and the exposed position of the most important part of the country around Oslo have never permitted Norway to become a really strong national unit. Hence, the country has been easily influenced by its neighbors, especially Denmark, which was long the leader among the Nordic countries.

Indeed, for many centuries Norway was in some degree the vassal of Denmark; and that situation continued until the beginning of the nineteenth century. Then Denmark lost its hold on Norway after the Napoleonic wars, and Norway was forced into a union with Sweden. The union was not satisfactory to the Norwegians, and in 1905, after long agitation, they obtained complete independence under their own elected king. National feeling developed markedly, as shown for instance in the desire to abandon the generally used Danish language, or *riksmaal*, for the more truly Norwegian *landsmaal*; the two are closely related, and both are common throughout the country.

The present Norway, in spite of its rather small population, plays a significant part in world affairs. Not only do Norwegian vessels still ply the oceans everywhere, while descendants of former emigrants populate important parts of the earth's surface, but the 2.6 millions who still inhabit Norway contain an extraordinarily large number of outstanding men, especially in such fields as literature, music, science, and exploration. In this way, Norway, like Denmark and Sweden, is one of the leaders of the world's intellectual life. Together with the two other Scandinavian countries and Holland it stands guard as a protector of Europe's political peace and intellectual pre-eminence.

Note. In studying the production and trade of every country in Europe frequent use should be made of the diagrams on pages 610-615.

CHAPTER XX

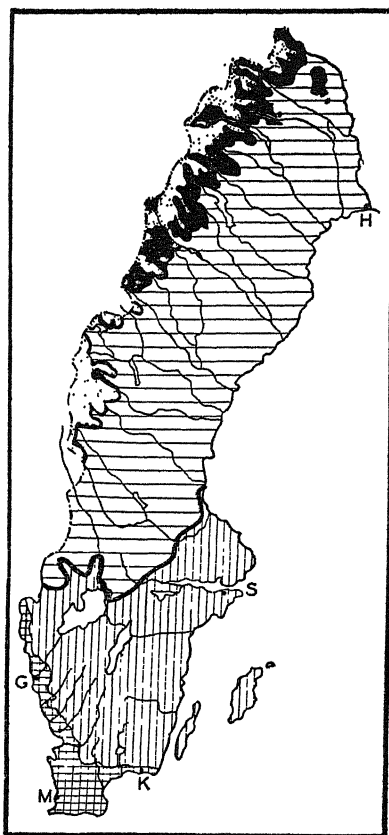
SWEDEN

Sweden and the Rest of Fennoscandia.—Sweden is the largest of the Nordic states in both area and population. Extending as far south as Denmark, but not quite far enough north to have a Lappish section like Norway and Finland, it is the most typical of the four Fennoscandian states. In common with Denmark it has a large area with low relief and with a climate such that dairying is the dominant form of agriculture. Great coniferous forests link those of eastern Norway with those of Finland and in extent and economic value far surpass those of the other two countries. Forest products ranging from rough or sawed timber to wood pulp and paper are Sweden's main export. Sweden is also like the other countries in having coastal fisheries, although they are of much less importance than those of Norway. The Swedish merchant marine stands next to that of Norway in size and is much larger than those of Denmark and Finland.

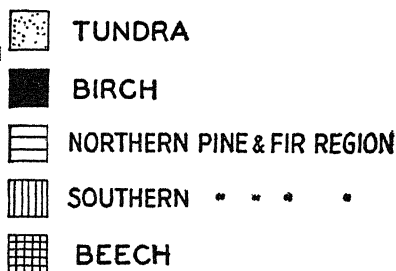
In one type of economic activity Sweden stands quite apart from the rest of Fennoscandia. Unlike the others, Sweden has a well-developed mining industry based mainly on iron ore, and this has led to the associated development of iron and steel plants and machine factories. Swedish metal products in their specialized fields rank uncommonly high, thus displaying the same quality which puts northwestern Europe in the very front rank in practically all fields, economic and artistic as well as social and scientific.

Politically Sweden differs from both Denmark and Norway in being essentially a Baltic country. It has, to be sure, what may be called an Atlantic coast with the flourishing harbor of Göteborg. Moreover, the southern or Atlantic part of the country has frequently been under Danish control. Nevertheless, Svealand, the historical heart of Sweden, has looked eastward and has sometimes expanded greatly in the direction of Finland and the Baltic States. Although thrust back later by Russia from the mainland, Sweden has remained a Baltic country, less influenced than Denmark by western and central Europe, but yet entirely western and a progressive part of Europe A in every respect. Today Sweden represents the purest type of Nordic state, with a very highly developed Nordic culture.

Regional Description. *Skåne* (Region III in A232). *Skåne* in the far south of Sweden closely resembles the Danish Isles, of which it is the direct continuation. The Scandinavian or Nordic block of hard granite and gneiss has here sunk so far that it has been covered by younger, softer layers of lime and clay, while glacial loam adds to the fertility of the region. Rolling divides separate wide sections of level land which under the marine climate (A240, A241, A36) are suitable for intensive utilization. In some parts, especially along the west and east coasts, as much as 90 per cent of the whole area is under cultivation. Seen from above, the fields form a perfect mosaic, rarely broken except by the many scattered farmhouses and tiny villages. The larger towns and cities are concentrated on the coast. Malmö, the chief of these, lies opposite Copenhagen on the Sound, but the attractiveness of Copenhagen overshadows its growth. The land is used in much the same way as in the Danish Isles, with oats as the leading grain, but also with rye, wheat, barley, potatoes, and fodder crops. Wheat stands second among the cereals, and sugar beets show astonishingly high yields, reflecting the scientific intensity of the production. Altogether this small part of Sweden produces 25 per cent of the country's food output (in calories). Here, also, are Sweden's only coal-



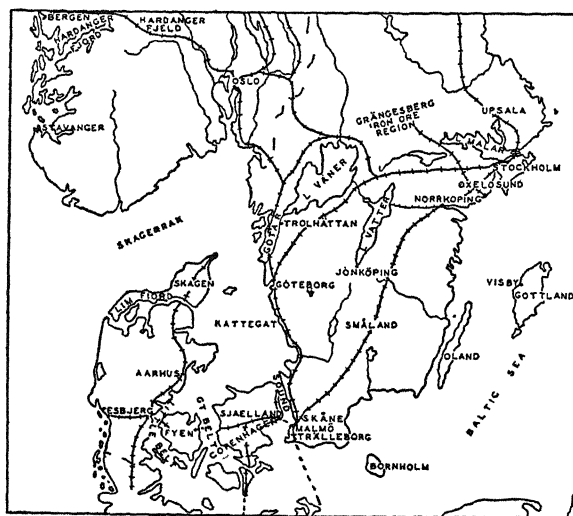
VEGETATION OF SWEDEN



A—Vegetation in Sweden

mines. They produce only a small fraction of the coal consumed in the country, but are a decided asset.

Småland (Region IV, A232).—The Småland Plateau is a detached part of the northern Swedish uplands from which it is separated by the lowlands of central Sweden. Its upland character is emphasized by a more severe winter climate and shorter summers than those of Skåne, while the thin morainic soil is not suitable for intensive cultivation. Hence most of Småland is under forest, in which the dominant conifers are intermingled with broad-leaved trees such as the aspen (A247). In contrast with Skåne, where most of the original beech oak forest is gone, Småland relies on forestry as an important element in



A—Cities and Main Railroads in Southern Scandinavia.

the use of the land. Only along the coasts where marine deposits cover the glaciated rock, and in some valleys, does agriculture have great significance. A typical industry is the making of matches based on aspen timber, much of which is now imported. For this industry Jönköping is the center (A248).

The islands of Öland and Gotland differ from Småland in that their geological base is sedimentary layers of limestone and schist instead of hard older rocks. Sheep graze on the dry limestone hills of Öland, but Gotland has a high percentage of arable land on which grains are the chief crop. Visby, the main harbor, now attracts tourists because of the beautiful remnants of the glorious

period when, as a member of the Hanseatic League, it was the center of Baltic trade.

The Central Swedish Lowland (Region V, A232).—Between the Småland Plateau in the south and the leeward slope of the Scandinavian mountain backbone extends a rolling lowland, the homeland of the Swedes. Glacial features are prominent. They include not only little morainic ridges, indicating temporary fronts of the icesheet, and a great number of lakes caused by glacial erosion, but also many eskers. The eskers are long, sinuous, narrow ridges from ten to fifty or more feet high, and are composed of sandy and stony glacial material deposited by running water in the beds of streams which flowed between walls of ice underneath the icesheet. The shape and size of the larger lakes, Vänern and Vättern, are due not only to glacial erosion, but likewise to the breaking of the hard rocks under the pressure of the Alpine period. This gave rise to a pattern of cracks or fault lines which causes many valleys and lakes to be orientated along parallel lines. At least two such parallel series running in different directions can be seen on any large map of Sweden.

The present geography of the Central Swedish Lowland can best be understood through a knowledge of the post-glacial history of the region. On this depends one of the two great natural factors in Swedish agriculture, namely, the soil. After the Nordic glacier had retreated from the Jutland stage when it formed the Danish moraines, it remained stationary for a long time with its front in central Sweden. Large terminal moraines south of the lake area mark this period. They appear to be the western extension of the Finnish Salpaus Selkä which will be described in the next chapter. As the ice retreated farther north, the so-called Yoldia Sea covered the depressions of the Baltic Sea and central Sweden, extending its waters across Sweden to the Skagerrak in the west, and across Finland to the White Sea in the northeast. The Småland area and part of Skåne remained above water, so that the present Danish outlet of the Baltic Sea did not exist. In due time continued rising of the Baltic block broke the connection between the sea and the ocean. Thus what had been the Baltic Sea became a lake called Ancylus which had to rise so high to find an outlet that it covered what are now the coastal areas of Sweden and Finland.

This Yoldia stage was followed by a third stage marked by still further rising of the northern part of the Nordic block, while the southern section was depressed. In this way the lake acquired a new outlet through Denmark instead of across Svealand, and its shape became essentially that of the Baltic Sea at present. The rising of

the northern part of the block is still going on at the rate of about three feet per century. This is responsible for a gradual diminution in the area of the sea. The names of some inland villages indicate that they were at one time located on the shore.

This geological development is of great economic importance because of its effect on the soil. The thin moraine covering that part of the Nordic block which was not submerged provides a poor, very stony soil of little value. The area once covered by the sea is more fortunate. Although the water in some places washed the glacial débris off the rocks and left them bare, in the intervening hollows it deposited clay and sand which formed an excellent soil. Farther south in Skåne and the Danish Isles the glacial deposits are of a finer and more fertile type than in Småland, so that there as well as in the submerged area the soil is good.

A second basic factor in Swedish agriculture is the modified marine type of climate. Sweden is located near the track of many cyclonic storms which follow the Baltic, while the dominating southwest winds prevent severe winters. At Stockholm the coldest month, February, has an average temperature of 26° F.; at Göteborg, with its more western location, the average is only 31° F. Contrast both of these with Tobolsk in nearly the same latitude in western Siberia where the January average is 2° F. below zero. Nevertheless, the distance of Sweden from the Atlantic, and the noticeable leeward position of the northern part in respect to the Norwegian highland, result in greater continentality than in Norway and Denmark. This shows itself in stronger seasonal differences in temperatures and a decreasing precipitation with a decided summer maximum.

The response to this physiography and climate makes a very attractive country. Forests, mainly coniferous, especially in the north, cover most of the higher areas, but the valleys and the lower sections, with their marine deposits, are under cultivation. Roughly speaking, meadows and croplands show equal acreage, but the dominance of oats among the crops shows the importance of livestock, while food grains, for example, wheat and rye, cover only small sections. As in Denmark, dairying prevails, and butter as well as bacon is exported, but neither of these is so important as in Denmark.

Most of the cultivated land of central Sweden is concentrated in the southern part of the lowlands and along the main valleys leading northwards (A237). The Syljan lake region, the northern edge of the lowland, is an interesting exception. Here outcrops of limestone produce unusually fertile soil, and numerous prosperous villages surrounded by crops and meadows make this almost an oasis of produc-

tion and culture amid the great northern forests. Many Swedish city people come to this region to spend the summer. The attractiveness of the summer resorts is increased by the fact that here, as in some other parts of Sweden, many of the women wear the beautiful old village costumes. Fair-haired, blue-eyed girls in lovely embroidered costumes with trimmings of red, blue, and gold and with striped, full skirts, ride bicycles through shady streets bordered with fine trees and pretty summer homes.

Forests of valuable softwood (A247) have made lumbering a principal source of income. Their value is much increased by both the transportation and the waterpower afforded by many streams running southwards towards the coast or the great lakes. Along the north shores of Lake Vänern pulp and paper factories, as well as sawmills, dot the landscape (B254). The Trollhättan Canal, avoiding the waterfall of the Göta River and forming part of an inland waterway from Stockholm to Göteborg, gives an outlet to the coast for export.

Northeast of Lake Vänern, extending almost to the Baltic shores, is the main iron-ore district of central Sweden, the so-called Grängesberg region. Copper, for which Sweden was once famous, has lost most of its significance, but large deposits of iron ore are still mined and furnish the basis for a very highly developed industry. Swedish iron and steel plants, still using charcoal for the smelting of the ore, produce a product of special quality which has not yet been duplicated elsewhere. It is especially good for tools and for machines where special strength and hardness are required. Products of this sort are made not only for the home market but also for export. This Swedish industry resembles that of Switzerland in its specialization and high quality. Since Sweden lacks coal, large quantities of iron ore are shipped from Oxelösund, especially to Germany and Poland.

Other manufacturing industries have developed also, some, such as the textile branch, being based on former home industries, and some, such as the chemical branch, on the large supply of power and the needs of a home market. The textiles include chiefly woolen goods centered in Norrköping and cotton goods centered at Göteborg.

The Central Lowland contains the greater part of the Swedish inhabitants (A242). Red farmhouses with big red barns and stables are scattered all over the arable land; large, stately country homes and castles, seats of the Swedish nobility, appear here and there. The villages are inconspicuous, for each usually contains little more than a church, an inn, and a couple of stores. Most of the people live on the farms.

Among the many towns which are now centers of industry, Stockholm and Göteborg deserve special notice. Stockholm, the Swedish capital with half a million people, is situated where the narrow outlet from Lake Mälär to the sea facilitates an easy crossing of this body of water. It looks toward the east where lay the colonial fields of Sweden for many centuries. For this reason it quickly overshadowed Uppsala, the old capital, university center, and seat of the Swedish archbishop, and became the center of Svealand, the heart of Sweden. In later days Sweden was obliged to turn to the west for much of its trade, but Stockholm as the political capital has retained its pre-eminent position, although Göteborg has surpassed it in commercial importance. Stockholm's situation along the lake and on islands, its interesting Scandinavian architecture, its teeming waterways, and its beautiful garden suburbs on the pine-covered coastal islands make the city worthy to rank with Copenhagen as the finest typification of Nordic culture.

Göteborg has grown from a town of 14,000 inhabitants in 1800 to a great city of over a quarter of a million. It reflects both the vast increase of Atlantic trade and the importance of the city as an industrial center. Well situated at the mouth of the Göta River, protected by coastal islands on which attractive summer resorts are found, as well as fishing villages where herring and mackerel are of chief importance, it is a busy city, although it lacks the appeal of Stockholm.

Northern Sweden (XII in A232).—Northern Sweden is called Norrland by the Swedes. In spite of its large size, its topography is rather uniform. The Swedish slopes of the Scandinavian Plateau drop very gradually eastward. The inclined surface of old rocks has been thoroughly glaciated and shows the usual glacial features such as lakes, waterfalls, and, in the high western parts, glacial cirques. The many rivers run parallel to each other toward the southeast following the regular slope, and each of them has one or more lakes along its course. The divides between the rivers are so inconspicuous that portages, as in Canada, interconnect neighboring river systems. The climate shows a true continental character as a result of the leeward location. The winters are long and severe, and the lakes and rivers are ice-covered for a long period amounting to 200 days in the far north. Even the Bothnia Gulf, in spite of being much warmer than the land in winter (A240), freezes regularly along the whole coast from a little north of Stockholm to the head of the gulf. In the north the ice lasts from November until June. The water freezes at a comparatively high temperature because of the low salt content of

the water, a result of the inflow of numerous rivers and the narrowness of the connection with the ocean. Sometimes it is possible to cross the ice to Finland.

The cultivated land of this northern section of Sweden is limited to the coastal plains where marine deposits, due to a former high level of the Baltic and the Ancylus Lake, give suitable soils. Hay, barley, oats, and potatoes are the main crops; cattle graze on the hillside pastures and are stall fed during the long winters. But even along the coast, rural population is sparse and the great economic value of the tremendous forest entirely overshadows agriculture. Except for tundra on the high mountains and in the far north, forests cover the whole region (A247). They consist of conifers except for occasional birches, which also form a narrow belt between the tundra and the conifers.

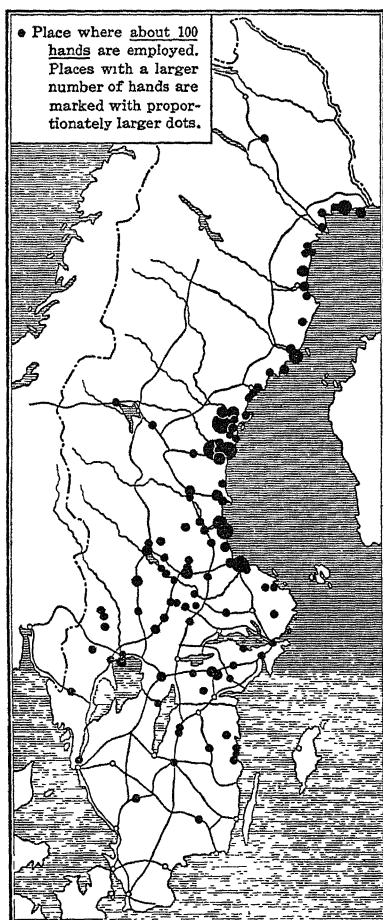
In this main timber region of Sweden the trees are cut in the winter and the felled trees are brought by sledge over the snow to the frozen rivers not far away. The streams lie so close together that the average distance to the water is short. In the spring when the ice melts, the high water carries the logs to the sawmills near the coast (A254). The melting of the rivers naturally begins at the relatively warm coast, which is also the most southerly point for each river. Hence the ice melts from the mouth upward, thus avoiding floods like those of the northward-flowing Russian rivers and making the transportation of timber very easy.

If lakes intervene between the place of cutting and the point of destination, small motorboats are used to move the logs in rafts across the still water to the outlet. Lakes covered with logs, and rivers jammed by them, are common sights in Sweden. The number of trees felled each year is calculated at about 120 million.

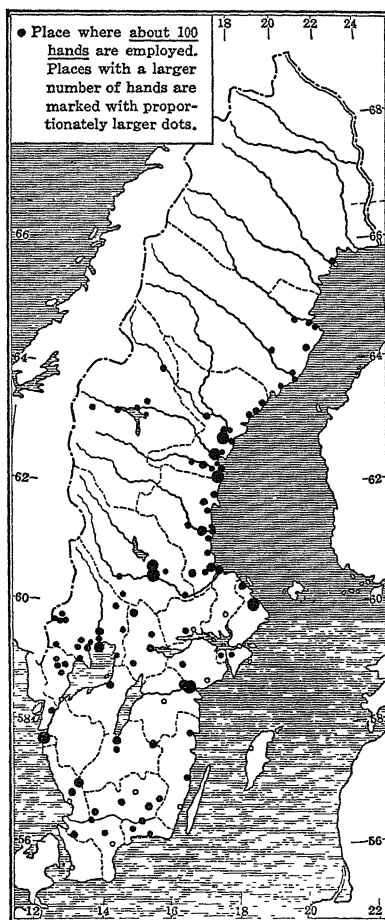
Little towns where the logs are sawn or changed into pulp or paper border the entire coast up to the far north (B254). They are located at the mouths of the rivers. In winter their harbors are ice-bound, and they are isolated except for the northern Swedish railway which runs well back from the coast, but sends branches to the coastal towns. In summer they are busy places, for not only are the sawmills humming and the pulpmills steaming, but many steamers arrive to carry loads of lumber, pulp, and paper to Britain, Germany, and elsewhere.

Another factor brings life into northern Sweden, namely, the mining of large quantities of iron ore. Aided by the railroad across the peninsula from Lulea on the Baltic to Narvik on the Atlantic and by the hydroelectric development nearby, the high-grade ore of Kiruna and Gällivare has been vigorously exploited. In summer Kiruna,

near the Norwegian boundary, exports its ore through Narvik while Gällivare uses Lulea. In winter the Narvik route alone remains open, for the water there is warmed by the Atlantic Drift. The Arctic climate is a severe handicap in the operation of the iron mines. It causes a very rapid labor turnover, for the miners leave as soon as



A—Swedish Lumber Mills.



B—Swedish Pulp Mills.

they get a little money. It also freezes the ore into solid blocks which are hard to handle for shipping.

In A232, Region XI, the section around Ostersistad, owes its separation from XII to two facts: first, the soft limestone which there forms the country rock is suitable for cultivation just as around the Siljan Lake; and second, the Trondheim gap allows marine influences

to extend beyond the divide and to ameliorate the climate. Around the lakes of this region meadows and even crops cover the lower part of the south-facing slopes, although forests prevail elsewhere. Hotels not only attract visitors in summer, but are open even in winter for visitors who want to enjoy the sports of skiing, skating, and coasting. Because of the gap in the mountains there is more snow here than elsewhere. Sports are popular in all Nordic countries, and the average level in athletics is very high. In proportion to their population Finland and the Scandinavian countries outrank all others as winners in the Olympic Games.

Sweden's Trade.—Although manufacturing here reaches an importance unknown in other countries of northwestern Europe, and occupies almost one third of the population, agriculture and stock-raising rank first among Sweden's industries. Since 1800, when the compulsory village system was abolished and the farming population became scattered, the crop area has increased threefold. The increase occurred mainly in the acreage of oats, hay, and root crops; food grains (wheat, barley, and rye) show much smaller gains. Sweden's imports show that there is a great deficit in this respect, which is only partly offset by the export of dairy products. The main exports, almost one half of the total, are forestry products. Iron ore, metals, and machinery account for one quarter. Raw textiles and coal are among the leading imports.

Sweden makes on the visitor the impression of a well-balanced, prosperous country, with high standards not only materially but also intellectually and morally. Like the other Scandinavian countries and Holland this country stands high among the nations of Europe A.

CHAPTER XXI

FINLAND

Finland and Sweden.—Finland, or Suomi, the land of the lakes as the Finnish name means, is in many respects the eastern continuation of northern and central Sweden, separated from it only by the shallow Bothnian Gulf. Both countries have a similar structural background and climate; both show a glacial topography with most of the soil removed except along the coast; both show a gradual transition from the open sea to the land in the form of innumerable rocky islands; both display the same dominance of forest only broken by innumerable lakes, rivers, and waterfalls; and both show the same economic response in the form of dairying and lumbering, supplemented by crops of oats, rye, barley, and potatoes wherever the soil is favorable. But Finland in contrast to Sweden has no southern extension with shorter winters, a longer growing season, and a more marine climate, and it also lacks direct contact with the Atlantic Ocean.

In the face of these disadvantages Finland is a remarkable example of a country that makes the most of its environment, for not only economically, but also culturally, Finland ranks high among the nations.

Cultural Zones.—A7 shows that Finland's southwest coast is included in Europe A, but within the country it also shows a transition from A to C as one goes from south and west to east and northeast. Several factors are responsible for this transition—a more severe continental climate as one goes northeastward, poorer soil, less contact with the imported Swedish culture which did not extend far inland. The transition can be seen on many maps in the well-known and beautiful *Atlas de Finlande*, in which maps and diagrams give complete information as to Finnish geography and culture. For instance, illiteracy, almost absent in the southwest, increases eastwards until it reaches 25 per cent near Ladoga Lake, while in contrast the bank savings decrease in the same direction from over six hundred to less than one hundred "finmarks" per inhabitant. Another factor will be brought out in the discussion of land utilization later on.

How far these differences depend on Finland's racial and historical

background cannot easily be determined. The Finns are probably of Asiatic (Mongolian) origin, and the small groups of Finns along the Volga may be considered a southern remnant of their westward migration. The Asiatic background of the Finns is still recognizable in their high cephalic index, broad figures, short stature, and relatively white rather than rosy skins as compared with the Swedes. Both Finns and Swedes are very blond, but the differences are so great that anthropologists are inclined to recognize a fair East Baltic race which is distinct from the blond Nordics. There has been much intermixture, however, and many of the Finns are almost Nordic in their appearance.

Early in the Middle Ages the Swedes settled in southwestern Finland along the coasts of the Bothnian Gulf and the Gulf of Finland. Their influence, helped by long political control, has been a major factor in Finland's cultural development. The Finno-Swedish culture which thus evolved was strong enough to uphold itself during the centuries of Russian rule. Hence Finland had in itself the elements for making a stable, independent state after the World War. Nevertheless, it is still a country of two racial and linguistic groups. Today, however, in contrast to the former Finnish state, the Finns have taken over the leadership, and the Swedish group (11 per cent of the population), although still the most prominent in culture and science, is perhaps destined to be submerged in the Finnish majority. Many of them say that the final aim should be one country, one people, and one language. In the Åland Islands, however, which were taken by Russia from Sweden in 1809 and kept by Finland after the World War, the Swedes are protected by special rights and will perhaps continue to maintain their separate existence.

Eastward and northward from the southwestern corner of Finland there is a more or less steady change in the racial composition of the Finnish population as appears in the following cephalic indices taken from Van Cleef's *Finland, the Republic Farthest North*: ..

FROM WEST TO EAST		FROM SOUTH TO NORTH	
Swedes	78.0	Swedes	78.0
South Ostrobothnians . . .	80.0	Tavasts	80.9
Tavasts	81.9	North Ostrobothnians . . .	82.6
Savoladians	81.3	Lapps	85.3
South Carelians	82.2		

The Carelians of this table, and especially the Lapps, are generally described as much less efficient than the true Finns or Russians who live near them. The Savoladians are probably much mixed with the South Carelians, as are the North Ostrobothnians with the Lapps.

Thus the cultural decline from southwest to northeast is accompanied by a change in race. The geographic environment, however, also becomes worse because of both poorer soil and a more continental or boreal climate.

Structure and Relief.—From a geological point of view, the whole Finnish area belongs to the Baltic block of granite, gneiss, and crystalline schist. During the Ice Age, the glaciers that moved from the northwest covered this region with a thick icesheet, and glacial erosion effectively removed the soil and left the rock bare and polished. During its retreat, the glacier stood for a long time in southern Finland where a double moraine, the Salpau Selka, was deposited in front of it and still forms a prominent characteristic of the landscape. This, as has been mentioned in the discussion of Sweden, is a continuation of the moraine system that crosses the southern part of Svealand. After the final retreat, Finland was for the greater part covered by the waters of the different stages of the Baltic Sea, but as in Sweden, constant rising brought the land above the water and gave to Finland its present shape, with the numerous islands offshore marking the continuation of the glacial relief.

Since the uplift was less marked in the south than in the center where it averaged about seven hundred feet, the drainage of the greater part of the country is to the south, with insignificant divides called *selkas* setting apart the smaller drainage systems tributary to the Bothnian Gulf and the White Sea. The central drainage system was blocked by the double terminal moraine and many minor glacial deposits, and the water was stored in lakes. The glaciated surface, however, was already full of depressions due to differences in the resistance of the rocks, to fault lines, and to former river systems, and thus was already predisposed to the formation of lakes. The result of all these conditions has been to create an enormous number of lakes. Just about one eighth of all Finland consists of lakes. According to one estimate the number of lakes south of Lapland exceeds 35,000; another estimate gives a total of 104,000 counting all the ponds.

Three main lake systems can be recognized, each with an outlet through the Salpau Selka: the Saima system in the east, drained by the Vuoksen River into Lake Ladoga; the Päijänne system in the central part with the Kymen River flowing to the Gulf of Finland at Kotka; and the Näsi Järvi system in the west draining by way of the Kumo River to the Bothnian Gulf. Because the Neva River, outlet of Lake Ladoga, is in Russia, the Imatra Canal was built to connect the Saima system directly with the Gulf of Finland. The three main

centers of Finnish waterpower, the base of manufacturing industries, correspond with these three outlets; the power plant of the Imatra waterfall where the Vuoksen breaks through the Salpau Selka is here the most important.

In the far north Finnish Lapland is a continuation of the Scandinavian anticline, low but somewhat more elevated than the rest of Finland, and with the main rivers flowing southward. The great Lake Enare in the north drains into the Arctic Ocean. The narrow corridor of Finland extending to the Arctic Coast at Petsamo Fiord is of importance because that harbor remains open the whole year round, protected from freezing in winter by the warm Atlantic Drift. Its potentialities have not yet been exploited, but there is already a highway to the north and a railroad is projected.

Regions and Resources.—Regions XIV and XV in A232 contain Finland's coastal regions where soils, deposited by the former expansion of the Baltic Sea, cover most of the rocks. The separation of the coast into two parts is based not only on location, one being along the Gulf of Finland, the other along the Bothnian Gulf, but mainly on latitude. The Bothnian coastal region, especially in its northern section, has a much longer and darker winter and consequently a much shorter growing season than the south or Helsinki coast.

Taking these two regions together, they represent most of productive Finland. Here are the oats, rye, barley, potatoes, and fodder crops, and the large meadows used for cattle grazing and hay (A109); here are the most productive forests, from which it is easy to float logs down the rivers towards the towns on the coast; here are most of the factories which are mainly sawmills, pulpmills, paper factories, and cellulose plants which make use of forest products. These same regions contain most of the cattle, especially the dairy cattle, and here are the larger cities aside from Tammerfors or Tampere, the Finnish textile center in central Finland (XVI). And finally here along the coast are the fishing towns and villages, catching the Baltic herring, and also the trading centers which connect Finland with the outside world.

The products of the forest and dairy form the two major groups of Finnish exports. They offset imports of grains, raw textiles, and general manufactures. Of these two, forest products alone account for almost three fourths of the exports in the form of boards and battens, veneers, wood pulp, paper, and matches, paper being sold in considerable quantities to the United States. The exports of butter and cheese, as well as eggs, go mainly to Germany. As in other Nordic countries, co-operative societies are very important, especially in the export of dairy products, of which 85 per cent are handled in this way.

Types of Farms.—The types of farms and the use of the land are well brought out by Van Cleef in *Finland, the Republic Farthest North*, from which the following facts are condensed.

The farms may be classified broadly into three general types: primitive, transitional, and modern. The first type is almost confined to the backward Carelian section along the Russian border. There the farms are small, the crops are limited in variety, and the buildings and equipment seem fifty or a hundred years out of date. Most of each farm consists of meadow and forest, but there are some fields of rye, oats, and barley for home consumption. Some horses and cows are found on practically all farms, but not in large numbers. Sheep, swine, and even poultry, although found in small numbers on many farms, are frequently missing. Life is reduced to its simplest terms and is notably primitive, the family being self-sufficient and selling practically nothing.

On the transitional farms modern machinery is beginning to be used. The horse-drawn mowing machine, however, is supplemented by much handwork with scythe or sickle; the hay rake competes with a platoon of muscular hand rakers; and the binder sets a grueling pace for the farm hands who gather an armful of wheat, oats, or rye and laboriously tie a piece of straw around it. In many instances a machine is not owned by a single farmer, but by a co-operative group, each farmer taking his turn in its use.

Although there are no more varieties of livestock on the transitional farm than on the primitive one, the number of animals, especially dairy cattle, assumes fair proportions. Dairying has played an important rôle in Finland from a very early date, and butter is probably the greatest source of ready money. The prosperity and skill of the farmer are usually well indicated by his dairy cattle. The abundance and richness of meadow hay and the difficulty of raising good crops of other kinds in so cool a climate have long made cattle-raising the easiest and most profitable type of farming.

The really modern type of farm is still uncommon in Finland, but in the southwest there is a fair number of farms that are fully equipped with modern implements and structures, and are well manned and scientifically operated. The uncertainty of the crops, however, because of the shortness and coolness of the summer, makes it difficult to accumulate the capital required by such farms and for experimental work by the individual farmer.

The transitional type of farm is by far the most common, and is prevalent even in the east among the primitive farms and in the southwest among less frequent modern farms. Its yield of crops per

acre averages higher than in the Baltic states and Russia, but lower than in Sweden, and is thus in harmony with the transitional character of the country in other respects.

One of the features of the farms that most attracts the attention of foreigners not only in Finland but in other Baltic and Scandinavian countries is the way in which hay and cereals are stacked to dry. Long rows of horizontal poles are set up about three feet above the ground and thirty or forty feet apart. On these the hay or grain is loosely hung to dry. In the cool, rainy summers the soil dries so slowly that, if the hay is made on the ground, it is in danger of spoiling. Hay cannot be kept out-of-doors in stacks, as is so common in central Europe. For this reason, as well as because of the abundance of dairy cattle, the barns in the Scandinavian and Baltic countries are large and prominent.

Towns and Cities.—As might be expected, the greater part of the 3.6 million Finns live in the coastal regions. In the southern part a density of 100 per square mile is reached, contrasting strongly with the emptiness of much of the interior, especially in the north. All the main cities are located along the coast of the Gulf of Finland, those of the Bothnian coast being too small for further reference.

Åbo, called Turku by the Finns, is the oldest city, its importance dating from the Hanseatic period. Its later development was greatly affected by political disturbances and the eventual removal of the government to Helsingfors. But it is still an important town and the center of the Swedish part of Finland, with two universities—the old Swedish one and a new national Finnish university. Helsingfors, which the Finns call Helsinki, is situated like Gibraltar at the point of a peninsula. Its development took place during the nineteenth century when it became the national capital, built up some admirable educational and cultural institutions, and gained rank as the main commercial harbor and principal city. Viborg, the Finnish Viipuri, is located on the Russian frontier and owes its modern importance to the movement of the products of the eastern section of the lake district through the Saima Canal. Hanko should be mentioned as Finland's winter port. Its marine location at Finland's extreme southwest point prevents it from being ice bound (A240). It is interesting to note that the trunk railway from Leningrad through Finland and around the Bothnian Gulf to Sweden does not pass through any of these cities. It runs well inland, sending branch lines to the various harbors. Strategic considerations on the part of the old Russian Empire, as well as higher land and the need of avoiding the wide lower parts of the rivers, may account for this.

Central and Northern Finland.—In A232 section XVI represents the Finnish lake plateau, bordered on the south by the Salpau Selka moraine. Here is Finland's great lake section, where the mosaic of land and water reaches perfection. The clear waters of the innumerable lakes and the green patches of swampy peat bogs are bordered by dark conifers which grow on the glacial hills and ridges. Man is found chiefly along the lake shores where he has cleared parts of the forest for crops and meadows and uses the lake for fishing. Two railroads extend from the southern trunkline into the lake region, and these, with the steamers on the larger lakes, provide an outlet for the products of forest and dairy, but the total population is small and is likely long to remain so. One city, Tampere or Tammersfors, has grown up on the southwestern edge of the lake region on the rapids between two lakes. It uses waterpower from the rapids for textile and paper mills.

Northern Finland (XIII) is still mainly unproductive. Its widespread forests are owned by the state, but the trees are small and of little value. On the north the forest merges into the Arctic. The inhospitable character of northern Finland is increased by the fact that the land rises to a height of a thousand feet or more and in the northwestern corner merges into the high coastal uplands of the Atlantic. Here live the nomadic Lapps with their herds of reindeer; their number is rather small and their contribution to the life of Finland practically nil. They succeed, however, in making a considerable political complication by their seasonal wanderings across the border between Finland and Norway or even Sweden, as well as into Russia. Some day the use of the Petsamo Fiord with its ice-free harbor and the exploitation of potential mineral resources may bring life into this desolate region, but today there is little prospect of this.

A good idea of Finland as a whole is given by figures as to the use of the land: forest covers almost three fourths of the total area; only 6.5 per cent is cultivated, to which can be added 3.5 per cent for natural meadows. The rest is either water or unproductive tundra. Among the countries of Europe only in Norway is the relative amount of cultivated land smaller. Nevertheless, the Finns have done extremely well under their disadvantageous conditions. There is an enormous contrast between the Lapps in their dirty little tents or huts and the cultivated Finns of Helsingfors in the stately buildings of their attractive city.

CHAPTER XXII

THE BALTIC STATES

Transitional Location.—The main geographic factor affecting Estonia, Latvia, and Lithuania is their transitional location between the Soviet Republics and western Europe. Not only do they form a barrier, or buffer zone, between Nordic and Russian Europe, but they lie in the transitional zone called Europe B, rising to the level of Europe A in the west, but falling to that of Europe C in the east. The contrast between the progressive city of Riga, for example, and the almost medieval city of Daugavpils (Dvinsk) only 125 miles farther east is remarkable. Another notable transition occurs from south to north. A great many statistics indicate that Lithuania is more backward than its neighbors to the north as well as to the west. The Latvians feel that they are distinctly superior to the Lithuanians, but that the Estonians may be on a level with themselves. The Estonians feel superior to the Latvians but tend to look up to the Finns. And the Finns in turn have a feeling of superiority to the Estonians, but admit that Sweden is ahead of them. Statistics and the general impressions of the traveler bear out these estimates. Thus, if one starts at Berlin in the center of one of Europe's most highly progressive and advanced nations, a decline in culture is manifest toward the northeast with a very marked drop in Lithuania. Then there is a steady rise toward the north as far as Finland. Back from the Finnish coast the level of culture falls rapidly, but if one continues around the main part of the Baltic Sea there is a further rise in southern Sweden.

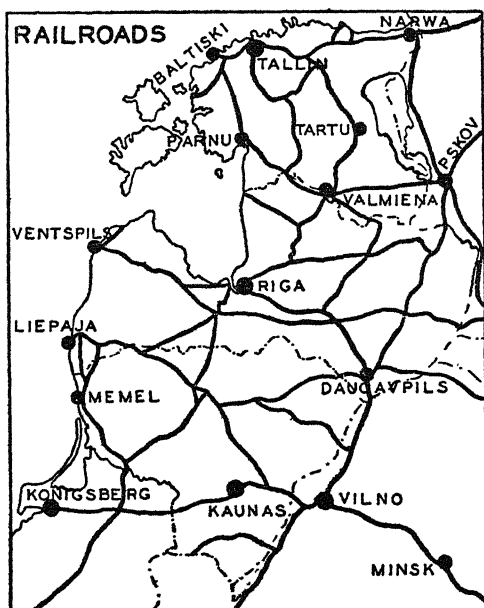
Common Interests.—Although each of the three Baltic states is an ethnographic unit, marked by uniformity of language, religion, and even race, they are all closely bound together. Their economic and political problems are more or less identical, especially in relation to Russia. Moreover, each of them faces the difficulty of establishing an orderly, modern, economic household out of the chaos of the World War, and must do this without much outside financial help. Perhaps some sort of economic union would be useful, as the present close co-operation between Estonia and Latvia suggests, but national differences are still too great to be easily reconciled in any very far-reaching union.

The similarity of the three countries may be seen in the fact that in all there are virtually no manufacturing industries outside of Riga and Narva, and the people rely almost entirely upon agriculture. There is, to be sure, a gradual change from north to south based on differences of soil, but reflecting in part also differences in historical development. In Estonia the conditions are much like those in Finland; Latvia shows a transition; and Lithuania is in many ways a part of the central European agricultural area with rye as the leading crop. But each of the countries is essentially Baltic, not only agriculturally, but likewise culturally and politically. With conditions in the land of the Soviets as they are today, each must turn to the

west for its cultural development, or else be absorbed by Russia. Being so small, they feel that they can find security against economic and political domination by their eastern neighbor only in the whole-hearted adoption of western culture and the furtherance of mutual co-operation.

Structure and Relief.

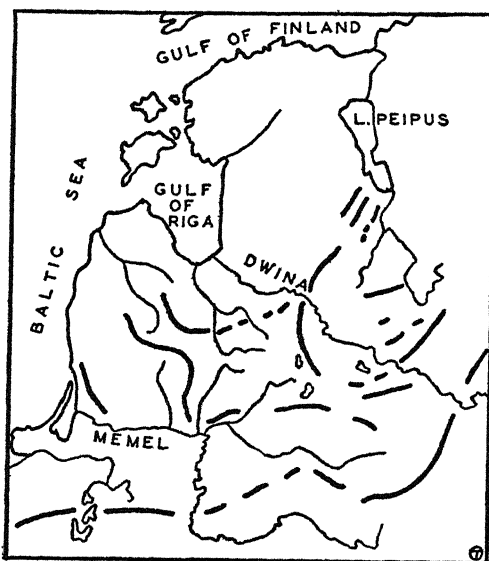
—The story of structure and relief is fairly simple. The Baltic block of ancient rocks which forms most of Finland here disappears, dipping down toward the south. Sedimentary deposits of Silurian, Devonian, and later



A—Railroads of the Baltic States.

ages have been laid down upon it, and dip with it toward the south. So in going south one crosses successive geological strata from the Silurian limestone and sandstone in the north to younger deposits farther south. Small escarpments sometimes indicate differences in the resistance of these strata; the coast of Estonia along the Gulf of Finland, for instance, is formed by the edge of a harder layer, the gulf itself being a depression between fault lines. In the south, however, the geological structure is relatively unimportant because a thick glacial cover overlies the lowlands (A265).

In the northern section of the Baltic States some areas like Finland are found. There the ancient icesheet removed the soil and left the barren rock. Only in depressions has enough soil accumulated to make crop-raising possible. Farther south, however, a region of accumulation is found, where great terminal moraines mark various stages in the retreat of the glaciers of the Ice Age. The main region of glacial hills is in the far south around Kaunas, or Kovno, and Wilno, or Vilna, where a part of the great Baltic terminal moraine extending from East Prussia continues toward the Valdai Hills in Russia. Farther north two sections of moraines surround depressions, one being occupied by the Gulf of Riga, the other by the Pskov and Peipus lakes of eastern Estonia. When the icesheet was retreating two tongues of ice apparently covered the present depressions, and moraines lay between them. The present drainage still shows the influence of the glacial conditions, but the valleys of the glacial period are now in part no longer used by rivers, and have given place to swampy moorlands. Except for the glacial hills the whole of the Baltic states is lowland, often monotonous and lacking in scenic beauty.



A—Terminal Moraines of the Baltic States.

In consequence of the glaciation there is a gradual change of soils from north to south. Whereas the northern section is barren rock or has only a thin cover of till, the southern section, with its loamy glacial deposits, is much more fortunate, and it is there that the main agricultural development is naturally centered.

Minerals are rare; the only deposits of importance are oil shales along the northern coast of Estonia. Some of these are worked by the state, but various concessions have been given to foreign groups. The output from these provides a small export, and production is increasing.

Climate.—The climate is transitional between the western marine

and eastern continental types. It is locally influenced by the Baltic Sea, which tends to form a pathway for cyclonic storms, especially along a line from Denmark to the Gulf of Finland. The Baltic also prevents the winter temperature from being so extreme as farther east. Memel, for instance, has an average of 27° F. in January, and Vilna, a degree farther south, but inland, 23° F. The summer temperatures range from 61° to 64° F. in July. The rainfall averages between 16 and 27 inches, decreasing toward the east and north. But the great factor is the variability of the weather. Since this is a zone of transition, weather changes are frequent and seasonal variations are marked. The winters may be of the severe continental type, or mild like the marine type; the summers may be distinctly wet or dry. These factors account for wide variations in crop production from year to year.

Use of the Land.—The influence of the soil on land utilization is best shown by a few figures. Cropland increases toward the south from 18 per cent in Estonia to 28 per cent in Latvia and 50 per cent in Lithuania. Grassland decreases from 46 per cent in Estonia to 30 per cent in Latvia and 28 per cent in Lithuania. Forests cover 20 per cent of Estonia, 29 per cent of Latvia, and only 17 per cent of Lithuania; and the unproductive area decreases from 16 per cent in Estonia to 12 in Latvia and 8 in Lithuania.

Crops.—In Estonia oats, barley, and rye are the leading crops and overshadow the others entirely. Each of these occupies between 250,000 and 400,000 acres. The barley is of the two-row variety, as in Denmark, and is used for stock feed. Flax is the main crop devoted to industry; and potatoes, as in all Baltic countries, are important, especially in the southern section, but even there the average yield is not good. In Latvia the same kinds of crops prevail except that barley declines while wheat gains in importance. Lithuania shows a marked predominance of rye, with oats second and barley third, but wheat has here become almost as important as barley. Estonia and Latvia do not grow sufficient grain for their own requirements, but Lithuania is self-sufficient except for rye, and sometimes has a small surplus for export. Sugar is mostly imported, although Latvia has a young beetsugar industry. From all three countries flax is an article of export, but most of the crop is used by the peasant women to make homespun cloth. The peasants have far more time than money, and as they are hard workers it still pays to make cloth for their garments, bedding, and so forth.

Livestock.—Stock-raising is especially significant in the northern sections of the Baltic States. Estonia has a well-developed dairy

industry modeled on the Danish example of co-operative methods, and dairy products are among the leading exports. Dairy by-products, of course, feed the swine. Crop failures, like that of 1928, sometimes reduce the number of livestock considerably. Latvia has also gone into dairying along the same lines. In both countries, and particularly in Latvia, the dairy industry is still in its infancy, and it is likely that the gradual adoption of better methods will very much improve it. The possibilities are hinted at by the fact that Denmark normally exports about 3 times as much butter per dairy cow as Estonia, 6 times as much as Latvia, and 12 times as much as Lithuania. It must be remembered, however, that the warm winters of Denmark, no colder than those of Washington, D. C., make cattle-raising much easier than do those of Riga, for example, which are as cold as those of Albany or Toronto. Even in Lithuania stock-raising, especially the dairy branch, is increasing at the expense of crop production. Thus these countries are tending toward a higher type of agriculture according to the scale employed in Count Teleki's map (A19). Live cattle and meat, as well as butter, are exported.

Forest Products.—Timber is one of the important export products of all three Baltic States. After the war, when the new countries faced the serious problem of balancing their trade, timber exports from the forests, which are for the greater part nationally owned, increased so much that their future was threatened. Now, however, the products of agriculture play an increasing part, and timber production can be carried on in a more rational way. Rough and sawn timber are the principal exports of this industry at present, but semi-manufactured wood is gaining in importance, and some wood pulp and paper are exported. The forests consist for the greater part of pines and firs, which cover four fifths of the woodland in Latvia, for example, but these are commonly intermixed with aspens, birches, and oaks.

Agrarian History.—In all three Baltic States the efficiency of agriculture is much too low. Figures for East Prussia with essentially the same soil and nearly the same temperature as Lithuania show that a far greater yield per acre is possible, and it is obvious that the dairy industry can be much advanced. Such conditions can be explained in part by a review of the historical background. The Baltic region was in former times one of the remotest corners of Europe, where paganism existed even down to the fourteenth century. Finnish tribes, the present Estonians, occupied the north; Baltic tribes, such as the Letts or Lithuanians, and the former Prussians, the south. During

the thirteenth century this region became the field of expeditions by German knights and of later exploitation by German traders.

Estonia and Latvia fell wholly under the influence of the Germans, but Lithuania resisted and for a time even extended its domain far south. The Baltic Germans did not keep Estonia and Latvia free from other foreigners such as the Danes, Swedes, and later the Russians, but in an economic sense the Germans remained the leaders, and the greater part of the country belonged to them as large landowners. Their influence was twofold. They brought German culture and energy and did a great deal to develop the region by furthering industries and education; but at the same time they looked upon the inhabitants as akin to slaves, and the social conditions of the peasantry were very low. Although the native population came politically under German influence, it kept its own language, and in time a strong national tendency developed, notably in the nineteenth century.

The destiny of Lithuania was different. It came under the influence of Poland and Polish land ownership. When Poland was divided it fell to Russia. There was no substantial economic improvement during the Polish and Russian occupation, and, compared with East Prussia, Lithuania was backward. From the time of the Polish influence the Roman Catholic church has held a leading position, in contrast to the Lutheran church which prevails generally in Latvia and Estonia.

A great change came after the World War when the Baltic States declared themselves independent. In order to check the influence of Soviet propaganda, the governments promised an important agrarian reform and fulfilled their promises. This agrarian reform has changed the situation entirely. Whereas in former times a great part of the land was held in large properties—in Estonia 58 per cent, in Latvia 43 per cent, and in Lithuania 40 per cent—small, individually owned landownings now prevail. In Estonia more than 5 million acres were pre-empted with little or no compensation to the former owners; a part of this, mainly forest and pasture land, was kept by the government, but a quarter of the acreage was granted to former tenants, and the remainder cut up to form small new properties. In Latvia the same thing happened, and at present only 10 per cent of the total area is in estates of above 250 acres. Here, too, a part of the confiscated property is held as a state reserve. In Lithuania the change was less radical, but even there small holdings are now of the first importance.

This change has had great disadvantages. First of all, a consid-

erable number of new farmers were without experience, a handicap which can be overcome only by many years of agricultural education. Many farms changed hands several times before they found a new occupant able to manage them. In the second place, the present farming population still uses very primitive methods, and therefore a great part of the tillable area lies fallow every year in order to recover its fertility. This means not only that the yield per acre is lower than it ought to be, but also that the amount of land cultivated per man is far too small to support anything beyond a very low standard of living according to western ideas. Because of this the advice of agricultural experts gives promise of being extremely useful, once the people are educated to follow it.

Another important point is that the small landowners, whether new or old, have never been financially able to buy machinery and fertilizer and so increase the productiveness of the soil. Co-operation is the remedy indicated for this situation. Here, as in Denmark, it seems as if it ought to be possible for the farmers to produce and sell their crops co-operatively, and so enjoy the advantages of large operations in spite of their small holdings. It is not reasonable to expect any magical solution of the problems of new countries, established since the war as independent entities without capital and burdened with heavy debts. Nevertheless, the record of recent years gives definite proof of accomplishment and promises a constant increase in production. The Baltic States seem to have the sort of energy and persistence that brings results.

The Population and Its Distribution.—The Baltic States are essentially rural; only 24 per cent of the people in Estonia, 23 per cent of those in Latvia, and 13 per cent of those in Lithuania live in towns. Estonia, with only a little over a million inhabitants on an area of 18,360 square miles, is the best ethnographic unit, for only 8 per cent of the population belong to non-Estonian groups. These include about 5 per cent of Russians and 1 per cent of Germans. Tallinn, formerly Reval, about the size of Jacksonville, Florida, is the capital, and by far the leading city. A Finnish settlement in the beginning, it developed into an important harbor during the time of the Russian occupation when it was the place of import for a great deal of the raw material used in the Moscow industrial area. It lost that trade after the war, but has gained importance as the capital of the new state. The harbor of Baltiska, formerly Baltic Port, is freer than Tallinn from ice in winter, but is very small. Narva, at the mouth of the Narova River, outlet of Lake Peipus, is an industrial town; and Tartu, formerly Dorpat, is the intellectual center with a famous uni-

versity. The small harbor of Parnu, formerly Pernau, might grow if overland transportation were better developed.

In Latvia about 2 million inhabitants on an area of 25,400 square miles give a density of population a little greater than that of Estonia. Only about 73 per cent of the people are Letts. The rest include Russians, 10 per cent; Germans, 4; Poles, 3; and Jews, 5. The latter appear here as an important factor in the urban commercial life. Riga, an old German settlement, is the capital and distinctly the most important city. It had its period of glory during the time of the Russian administration when it was an important commercial port like Tallinn, as well as an industrial center. In 1913 the population was nearly 500,000, but it decreased greatly during and after the war and has been recovering only slowly. The old town is still typically German in character. Daugavpils, originally a Russian settlement called Dvinsk, is located on the Duna River where railroads cross it, and where timber can be trans-shipped by water to Riga. It is so primitive that many stores and shops are covered with pictures to tell an illiterate population what is inside, but this is only a remnant of a situation that is fast passing away. Ventspils, formerly Windau, and Liepaja, formerly Libau, are little places that enjoy exceptional importance in winter because their harbors are not closed by ice; both lost much of their significance after the separation from Russia.

Lithuania, with more than two million people on an area only two thirds as large as South Carolina, is somewhat more densely populated than the other Baltic States. It is interesting to note the increase in density from Estonia to Lithuania as evidence of the influence of better soil and warmer climate, for most of the people are engaged in rural occupations. The capital, Kaunas (previously Kovno), not so large as Chattanooga, Tennessee, lies at the junction of the Memel and Vilna rivers. It became important only after the war when the old capital, Vilna, called Wilno by the Poles, was included within the boundary of Poland. Although Vilna had for the greater part a Polish population, Lithuania claimed it for various historical reasons, and the relations between Lithuania and Poland are consequently far from friendly. Their common boundary is still unfixed and trade is therefore seriously obstructed.

After the war Lithuania received a small section of the Baltic coast but no harbor. It therefore seized the German town of Memel, called by the Lithuanians Klaipėda, then under the administration of the League of Nations; and afterward gained permission to keep it as a sort of mandate. As the outlet of Lithuania at the mouth of the Memel River, this city may develop into a far more important harbor

than it could have become as a German community, but the sympathy of the greater part of the population is not pro-Lithuanian. This country has a high proportion of non-Lithuanians, over one quarter. Jews are very strongly represented in the towns. The absence of any really central or large city is one reason why Lithuania shows so many signs of backwardness.

Industry and Transportation.—Not much can be said of the development of manufacturing industries in the Baltic States. The separation from Russia was more or less disastrous to them. In Estonia, Narva is well known for its textile industry based on the waterpower of the Narova River, but the possible market for the products is small. The important metal and textile industry of Riga broke down entirely in the post-war crash, and is regaining its former position but slowly. Butter factories and sawmills are found all over the three countries, but in a large sense the Baltic States do not count for much in industry. The greatest difficulty lies in finding a market. Formerly this progressive fringe of old Russia did a good deal of manufacturing for that great empire. Today the Soviet market is closed, and the Baltic States are not sufficiently advanced to compete with western Europe in other markets.

One reason for this is the complicated and unsatisfactory condition of transportation. As roads are few and have not been very well cared for, especially during the war, transportation has been difficult except on a few navigable rivers and on the railroads. Nevertheless, here, as in the Nordic countries and Russia, a cover of snow in winter greatly facilitates communication in the rural districts. The railway system was developed during the Russian régime and was patterned to suit Russian interests. Consequently the harbors on the Baltic Sea had good connections with the Russian hinterland by east-and-west lines; and at the same time railroads from Germany to Leningrad, the former St. Petersburg, crossed this region from southwest to northeast. After the war the establishment of frontiers on ethnographic rather than economic lines produced the disastrous result of causing the railroads to cross and recross political boundaries, thus greatly impeding the movement of goods and passengers. For instance, it is impossible to go from Riga to Liepaja, the second city of Latvia, without entering Lithuania; nor is there any direct communication from Kaunas to its harbor, Memel (A264). The railroad center of Valga, claimed by both Estonia and Latvia, is divided into two parts by a political boundary running right through the city. The mutual relations among the Baltic States are becoming better, which is fortunate, for some sort of co-operation is essential if full

use is to be made of the available railroad system. A number of narrow-gauge lines must be expanded into standard roads to be made of practicable value.

When such conditions prevail as to internal transportation, it is not surprising that international transportation is not yet up to the pre-war standard. The difficulties in this respect are intensified by the mutual suspicion between the Soviet and its little northwestern neighbors, and by the strained relations between Lithuania and Poland. The air lines connecting Kaunas, Riga, and Tallinn with the neighboring countries have proved very useful.

Trade.—The development of trade is at present only local. Before the war the Baltic States were one of the most important sections of Russia, and much of the Russian Baltic trade was carried on through their harbors, especially in winter. In 1913, Tallinn had 10, Riga 40, Ventspils 9, and Liepaja 8 per cent of the total Russian trade on the Baltic. This commerce vanished after the war, but a recovery may be expected in the future. Leningrad and the White Sea harbors are not sufficient, and are too much handicapped by ice and distance, to handle the trade of such an enormous area as Russia. Hence special treaties will presumably be negotiated between the Soviet Republics and the Baltic States to permit the use of their harbors.

Close economic relations with the Soviets may be the only means of improving the economic status of the Baltic countries, but in accepting such a program the Estonians, Latvians, and Lithuanians all have a fear that it may interfere with their purpose to keep their own national culture looking for its inspiration to the west. Nevertheless, the geographic situation seems to demand that the Baltic states serve as one of the main links between the Soviet Republics and the rest of Europe.

Statistics of trade are summarized in the charts at the end of this book. Of the total Estonian foreign trade, amounting to much less than 1 per cent of that of the United States, the latter country provides 10 or 15 per cent of the imports but takes only 1 to 3 per cent of the exports. The Latvian foreign trade is nearly twice that of Estonia, but the share of the United States amounts to only half as great a percentage. American participation in the commerce of Lithuania, which is about like that of Estonia, is exceedingly small. Only in Lithuania is the trade balance favorable, but Estonia appears to be stabilizing its position, and Latvia has been improving its economic picture by large expenditures for foreign-made equipment.

CHAPTER XXIII

WESTERN EUROPE AND GREAT BRITAIN

Western Europe.—The British Isles, the Netherlands, Belgium, and France may be grouped together as western Europe. Portugal, Spain, and Norway also border the Atlantic Ocean, but the Iberian Peninsula as a whole is best classified as Mediterranean, while Norway belongs to northwestern Europe. As a group the countries of western Europe do not form so clear a unit as do the Nordic states of northwestern Europe. Each has experienced a distinct individual development, for ethnographically Great Britain and Holland are essentially Nordic, Ireland is Celtic, France is Romance, and Belgium lies in a zone of transition between Romance and Nordic influences. Moreover, parts of France are of the Mediterranean type, and other parts represent a transition to central Europe. Nevertheless, all countries of western Europe have in common (1) the west-coast marine type of climate; (2) close contact with the sea; (3) a consequent great development of overseas commerce; (4) large colonies which are intimately related to this commerce; and (5) a high development of manufacturing. This last is more important in Great Britain and Belgium than in France and Netherlands, but is significant in all four countries. Then, too, all these countries have attained a high cultural standing which is fairly uniform in spite of strong individuality.

Taken together the four countries of western Europe have well over 100 million inhabitants, which gives an average density of more than 300 persons per square mile. This, however, gives little indication as to cultural conditions, for large areas are almost uninhabited. A truer cultural measure is found in the fact that one eighth of the world's large cities of above 250,000 inhabitants are found in these four countries, although they contain only one twentieth of the world's population. Equally significant is the fact that these countries carry on as much foreign commerce as do nearly four times as many people in the remainder of Europe.

Factors in Britain's Outstanding Position.—Few people would question that Great Britain has for several centuries occupied a position of outstanding influence in world affairs. There is, however, much debate as to causes of this. Most authorities agree that insular-

ity, location, climate, and natural resources, as well as the character of the people, have played important parts.

1. *Insularity*.—The fact that Great Britain is an island and yet lies close to the mainland has been a great help in giving the country a leading position. Because the island has been cut off from hostile or competing countries by a strip of water, it has been able to develop its own peculiar characteristics more freely than have most countries. For example, the need of a strong central government which could act quickly in an emergency has been much less than in countries like France and Germany. This has made it easier to develop democratic institutions and representative government, two lines in which Britain especially excels. And this in turn has made Britain a refuge for persecuted Europeans who want to think for themselves. Again, the insular quality of Great Britain has compelled the people to use ships in order to engage in any kind of foreign trade. But once embarked in a loaded, seagoing ship, it is only a little more difficult to go a thousand or three thousand miles than one hundred. This fact became of supreme importance when the discovery of America shifted the center of maritime interest from the North Sea and the Mediterranean to the broad Atlantic. It has been one of the most important factors in helping Great Britain to build up foreign commerce and a great colonial empire.

2. *Location in Respect to Europe and America*.—Great Britain is also fortunate in being located off the western border of Europe near the meeting place of the Romance and Nordic types of culture. Because of this it has received a highly diverse assortment of ideas and institutions from each type. This is plainly evident in the English language which combines Teutonic and Latin elements so fully that we can almost say the same thing in two different languages and yet speak English in both cases. For example: "This book tells about the best home of man," or "This volume contains facts concerning the optimum human habitat." Our literature, laws, and customs reflect this same duality, and thus make for a richness of life rarely found outside the English-speaking world.

Another advantage of Great Britain is its location between continental Europe and America. Near enough to Europe to be genuinely European, it yet stands so far west that it is a natural stepping-stone between the two continents. Ireland, to be sure, lies still farther west, but it lacks contact with the rest of Europe and has other disadvantages which have prevented it from playing the rôle of middleman which has been vital in Great Britain. This in turn has been one of

the reasons why English-speaking people have colonized the best parts of the New World and Australia. Being posted on the edge of the new territory, like prospective settlers in the days when new lands were opened in the western United States, the British rushed in and seized what they wished at the first opportunity. Thus the British Empire owes its inception to the insularity and western location of Great Britain as well as to the character of the people and their great ability as sailors.

Another important but less commonly recognized advantage of Great Britain pertains to immigration and the quality of the people. The isolated location and insularity of the country, aided by the cool marine climate, long caused the island to remain not only relatively inaccessible, but almost uninhabited. Interstratified peat bogs and forests, as well as other lines of evidence, indicate that from about 1000 to 600 B.C. Britain was cooler and more humid than now. Even a slight change in this direction, as we shall see later, would make agriculture impossible in most parts of the island. Accordingly about 2500 years ago or later the population of Great Britain must have been extremely sparse, and the present population is derived largely from comparatively recent migrants who crossed the North Sea or English Channel after the climate ameliorated. The Celts, Saxons, Angles, Danes, and even the Normans who thus settled in England migrated under difficulties. People who migrate under such conditions usually, if not invariably, include an uncommonly high percentage of the sturdy, vigorous, adventurous, adaptable, strong-willed, and ingenious types. Those who are deficient in these qualities tend to stay at home or to be weeded out through the hardships, exposure, and discouragement of migration. Women and children suffer especially. Hence there is a drastic selection leaving survivors who form especially good material from which to build a nation. Practically all countries reap some benefit in this way, but Great Britain appears to have profited to an unusual degree by reason of its island isolation, its marginal but not too remote location, and the relatively inhospitable character of its climate until quite recent times.

The benefit thus derived did not end with the Normans. In later days Great Britain has received many other unusually fine types of immigrants. Flemings, Huguenots, Germans, and others have fled thither from religious or political persecution. Competent European artisans have been deliberately brought to England because of their skill; others have migrated thither because they were not satisfied at home, and England offered great opportunities. Even in recent decades Great Britain has received a large number of unusually able